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CEPP

GENERAL GUIDANCE FOR RISK MANAGEMENT PROGRAMS (40 CFR PART 68)

Chemical Emergency Preparedness and Prevention Office

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This document provides guidance to help owners and operators of stationary sources to determine if their processes are subject to regulation under section 112(r) of the Clean Air Act and 40 CFR part 68 and to comply with regulations. This document does not substitute for EPA's regulations, nor is it a regulation itself. Thus, it cannot impose legally binding requirements on EPA, states, or the regulated community, and may not apply to a particular situation based upon circumstances. This guidance does not represent final agency action, and EPA may change it in the future, as appropriate.

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INTRODUCTION

WHY SHOULD I READ THIS GUIDANCE?

If you handle, manufacture, use, or store any of the toxic and flammable substances listed in 40 CFR §68.130 (see Appendix A of this document) above the specified threshold quantities in a process, you are required to develop and implement a risk management program rule issued by the U.S. Environmental Protection Agency (EPA). This rule, "Chemical Accident Prevention Provisions" (part 68 of Title 40 of the Code of Federal Regulations (CFR)), applies to a wide variety of facilities that handle, manufacture, store, or use toxic substances, including chlorine and ammonia and highly flammable substances such as propane. This document provides guidance on how to determine if you are subject to part 68 and how to comply with part 68. If you are subject to part 68, you must be in compliance no later than June 21, 1999, or the date on which you first have more than a threshold quantity of a regulated substance in a process, whichever is later.

The goal of part 68 — the risk management program — is to prevent accidental releases of substances that can cause serious harm to the public and the environment from short-term exposures and to mitigate the severity of releases that do occur. The 1990 Amendments to the Clean Air Act (CAA) require EPA to issue a rule specifying the type of actions to be taken by facilities (referred to in the statute as stationary sources) to prevent accidental releases of such hazardous chemicals into the atmosphere and reduce their potential impact on the public and the environment. Part 68 is that rule.

In general, part 68 requires that:

- Covered facilities must develop and implement a risk management program and maintain documentation of the program at the site. The risk management program will include an analysis of the potential offsite consequences of an accidental release, a five-year accident history, a release prevention program, and an emergency response program.

- Covered facilities also must develop and submit a risk management plan (RMP), which includes registration information, to EPA no later than June 21, 1999, or the date on which the facility first has more than a threshold quantity in a process, whichever is later. The RMP provides a summary of the risk management program. The RMP will be available to federal, state, and local government agencies and the public.

- Covered facilities also must continue to implement the risk management program and update their RMPs periodically or when processes change, as required by the rule.

The phrase "risk management program" refers to all of the requirements of part 68, which must be implemented on an on-going basis. The phrase "risk management plan (RMP)" refers to the document summarizing the risk management program that you must submit to EPA.

GUIDANCE FOR INDUSTRY-SPECIFIC RISK MANAGEMENT PROGRAMS

EPA is working with industry to develop guidance for industry-specific risk management programs for the following industries:

- ✦ Propane storage facilities
- ✦ Chemical distributors
- ✦ Warehouses
- ✦ Ammonia refrigeration
- ✦ POTWs

The industry-specific guidances are undergoing review. When completed, these will be available from EPA (see Appendix E for information on obtaining part 68 documents from EPA).

Industry-specific guidances developed by EPA will take the place of this guidance document and the *Risk Management Program Offsite Consequence Analysis Guidance* for the industries addressed. If an industry-specific program exists for your process(es), you should use it as your basic guidance because it will provide more information that is specific to your process, including dispersion modeling and prevention program elements.

HOW DO I USE THIS DOCUMENT?

This is a technical guidance document designed for owners and operators of sources covered by part 68. It will help you to:

- ◆ Determine if you are covered by the rule;
- ◆ Determine what level of requirements is applicable to your covered process(es);
- ◆ Understand which specific risk management program activities must be conducted;
- ◆ Select a strategy for implementing a risk management program, based on your current state of compliance with other government rules and industry standards and the potential offsite impact of releases from your process(es); and
- ◆ Understand the reporting, documentation, and risk communication components of the rule.

This document provides guidance and reference materials to help you comply with EPA's risk management program regulations. You should view and retain this guidance as a reference document for use when you are unsure about what a requirement means. This document does not provide guidance on any other rule or part of the CAA.

STATE PROGRAMS

This guidance applies to 40 CFR part 68. You should check with your state government to determine if the state has its own accidental release prevention rules or has obtained delegation from EPA to implement and enforce part 68 in your state. State rules may be more stringent than EPA's rules. They may cover more substances or cover the same substances at lower thresholds. They may also impose additional requirements. For example, California's state program requires a seismic study. See Chapter 11 for information on state implementation of part 68. Unless your state has been granted delegation, you must comply with part 68 as described in this document even if your state has different rules under state law.

WHAT DO I DO FIRST?

Before developing a risk management program, you should do five things:

(1) Determine which, if any, of your processes are covered by this program

Only sources with a threshold quantity of a regulated substance (see 40 CFR 68.130 in Appendix A) in a "process" need to comply with part 68. "Process" is defined by the rule in § 68.3 and does not necessarily correspond with an engineering concept of process. The requirements apply only to covered processes. See Chapter 1 for more information on how to define your processes and determine if they are subject to the rule.

(2) Determine the appropriate program level for each covered process

Depending on the specific characteristics of a covered process and the results of the offsite consequence analysis for that process, it may be subject to one of three different sets of requirements (called program levels). See Chapter 2 for more information.

(3) Determine EPA's requirements for the facility and each covered process

Certain requirements apply to the facility as a whole, while others are process-specific. See Chapter 2 for more information.

(4) Assess your operations to identify current risk management activities

Because you probably conduct some risk management activities already (e.g., employee training, equipment maintenance, and emergency planning), you should review your current operations to determine the extent to which they meet the provisions of this rule. EPA does not expect you to redo these activities if they already meet the rule's requirements. See Chapters 5 to 8 individually for guidance on how to tell if your existing practices can meet those required by EPA.

(5) Review the regulations and this guidance to develop a strategy for conducting the additional actions you need to take for each covered process. Discuss the requirements with management and staff.

The risk management program takes an integrated approach to assessing and managing risks and will involve most of the operations of covered processes. Early involvement of both management and staff will help develop an effective program.

REQUIREMENTS ARE PERFORMANCE BASED

Finally, keep in mind that many of these requirements are performance-based; that is, EPA is not specifying how often you must inspect storage tanks, only that you do so in a manner that minimizes the risk of a release. This allows you to tailor your program to fit the particular conditions at your facility. The degree of complexity required in a risk management program will depend on the complexity of the facility. For example, the operating procedures for a chemical distributor are likely to be relatively brief, while those for a chemical manufacturer will be extensive. Similarly, the length of training necessary to educate employees on such procedures would be proportional to the complexity of your operating procedures. And while a facility with complex processes may benefit from a computerized maintenance tracking system, a small facility with a simpler process may be able to track maintenance activities using a logbook.

There is no one "right" way to develop and implement a risk management program. Even for the same rule elements, your program will be different from everyone else's program (even those in the same industry) because it will be designed for your specific situation and hazards — it will reflect whether your facility is near the public and sensitive environmental areas, the specific equipment you have installed, the managerial decisions that you have made previously, and other relevant factors.

WHERE DO I GO FOR MORE INFORMATION?

EPA's risk management program requirements may be found in Part 68 of Volume 40 of the Code of Federal Regulations. The relevant sections were published in the *Federal Register* on January 31, 1994 (59 FR 4478) and June 20, 1996 (61 FR 31667). A consolidated copy of these regulations is available in Appendix A. In addition, EPA has finalized a rule adopting the provisions covered by the Stay of Applicability included in the June 20, 1996, final rule, 40 CFR §68.2 (January 6, 1998, 63 FR 640).

EPA is working with industry and local, state, and federal government agencies to assist sources in complying with these requirements. For more information, refer to Appendix E (Technical Assistance). Appendices C and D also provide points of contact for EPA and OSHA at the state and federal levels for your questions. Your local emergency planning committee (LEPC) also can be a valuable resource and can help you discuss issues with the public.

Finally, if you have access to the Internet, EPA has made copies of the rules, fact sheets, and other related materials available at the home page of EPA's Chemical Emergency Preparedness and Prevention Office (http://www.epa.gov/ceppo/). Please check the site regularly as additional materials are posted.

IF YOU ARE NEW TO REGULATIONS

We have tried to make this document as clear and readable as possible, but if you have rarely dealt with regulations before, some of the language may seem initially odd and confusing. All regulations have their own vocabulary. A few words and phrases have very specific meanings within the regulation. Some of these are unusual, which is to say they are not used in everyday language. Others are defined by the rule in ways that vary to some degree from their everyday meaning. The following are the major regulatory terms used in this document and a brief introduction to their meaning within the context of part 68. They are defined in § 68.3 of the rule.

"*Stationary source"* basically means facility. The CAA and, thus Part 68 use the term "stationary source" and we explain it in Chapter 1. Generally, we use "facility" in its place in this document.

"Process" is given a broad meaning in this rule and document. Most people think of a process as the mixing or reacting of chemicals. Its meaning under this rule is much broader. It basically means any equipment, including storage vessels, and activities, such as loading, that involve a regulated substance and could lead to an accidental release. Chapter 1 discusses the definition of process under this rule in detail.

"Regulated substance" means one of the 140 chemicals listed in part 68.

"Threshold quantity" means the quantity, in pounds, of a regulated substance which, if exceeded, triggers coverage by this rule. Each regulated substance has its own threshold quantity. If you have more than a threshold quantity of a regulated substance in a process, you must comply with the rule. Chapter 1 explains how to determine whether you have a threshold quantity.

"Vessel" means any container, from a single drum or pipe to a large storage tank or sphere.

"Public receptor" generally means any place where people live, work, or gather, with the exception of roads. Buildings, such as houses, shops, office buildings, industrial facilities, the areas surrounding buildings where people are likely to be present, such as yards and parking lots, and recreational areas, such as parks, sports arenas, rivers, lakes, beaches, are considered public receptors. Chapter 2 discusses public receptors.

"*Environmental receptor*" means a limited number of natural areas that are officially designated by the state or federal government. Chapter 2 discusses this definition.

WHAT IS A LOCAL EMERGENCY PLANNING COMMITTEE?

Local emergency planning committees (LEPCs) were formed under the Federal Emergency Planning and Community Right-to-Know Act (EPCRA) in 1986. The committees are designed to serve as a community forum for issues relating to preparedness for emergencies involving hazardous substances. They consist of representatives from local government, local industry, transportation groups, health and medical organizations, community groups, and the media. LEPCs:

- ✦ Collect information from facilities on hazardous substances that pose a risk to the community;
- ✦ Develop a contingency plan for the community based on this information; and
- ✦ Make information on hazardous substances available to the general public.

Contact the mayor's office or the county emergency management office for more information on your LEPC.

CHAPTER 1: GENERAL APPLICABILITY

1.1 INTRODUCTION

The purpose of this chapter is to help you determine if you are subject to Part 68, the risk management program rule. Part 68 covers you if you are:

- The owner or operator of a stationary source (facility)
- That has more than a threshold quantity
- Of a regulated substance
- In a process.

The goal of this chapter is to make it easy for you to identify processes that are covered by this rule so you can focus on them.

This chapter walks you through the key decision points (rather than the definition items above), starting with those provisions that may tell you that you are not subject to the rule. We first outline the general applicability provisions and the few exemptions and exclusions, then discuss which chemicals are "regulated substances." If you do not have a "regulated substance" at your site, you are not covered by this rule. The exemptions may exclude you from the rule or simply exclude certain activities from consideration. (Throughout this document, when we say "rule" we mean the regulations in part 68.)

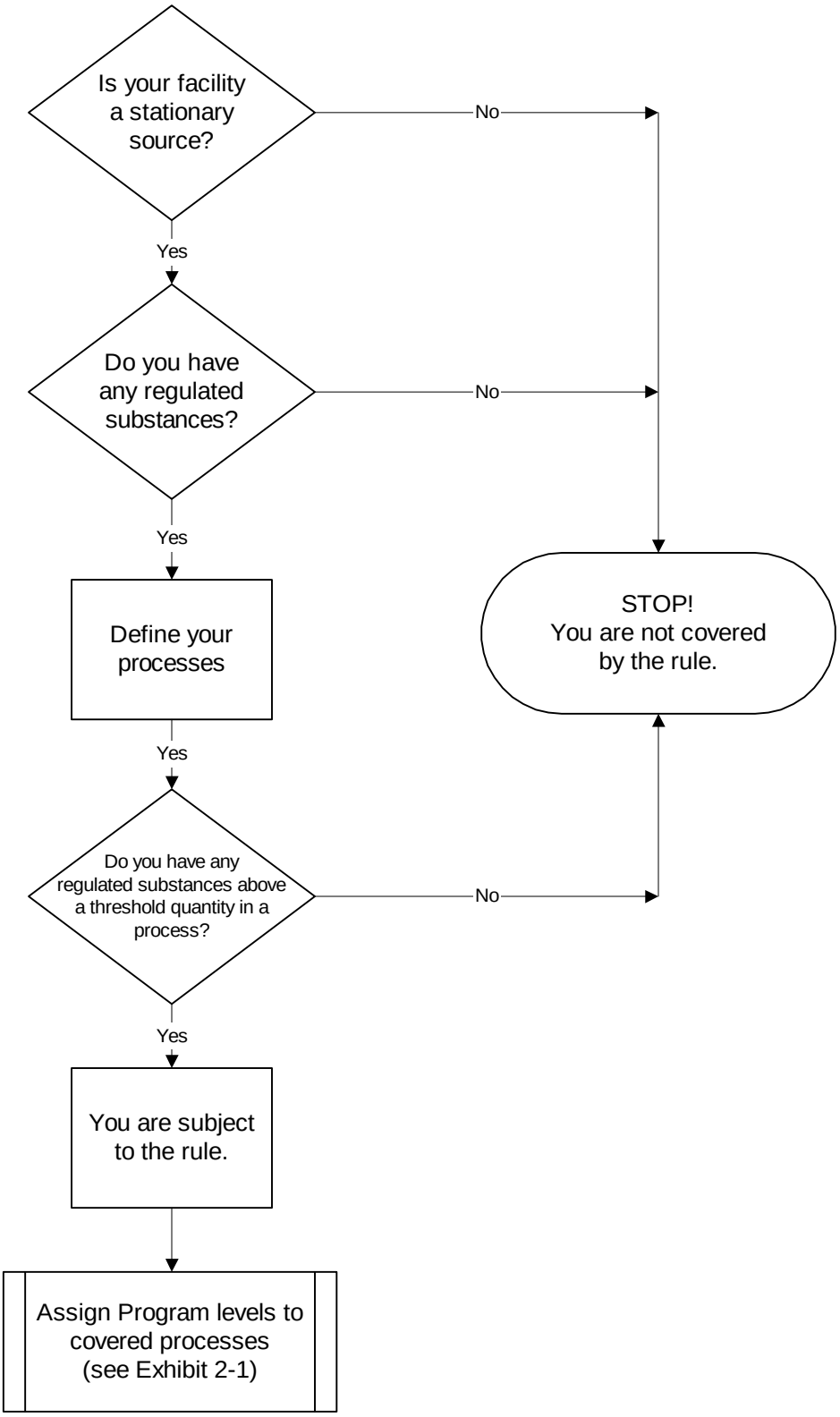
We then describe what is considered a "process," which is critical because you are subject to the rule *only* if you have more than a threshold quantity in a process. The chapter next describes how to determine whether you have more than a threshold quantity.

Finally, we discuss how you define your overall stationary source and when you must comply. These questions are important once you have decided that you are covered. For most facilities covered by this rule, the stationary source is basically all covered processes at your site. If your facility is part of a site with other divisions of your company or other companies, the discussion of stationary source will help you understand what you are responsible for in your compliance and reporting. Exhibit 1-1 presents the decision process for determining applicability.

STATE PROGRAMS

This guidance applies to only 40 CFR part 68. You should check with your state government to determine if the state has its own accidental release prevention rules or has obtained delegation from EPA to implement and enforce part 68 in your state. State rules may be more stringent than EPA's rules. Unless your state has been granted delegation, you must comply with part 68 as described in this document even if your state has different rules under state law. See Chapter 11 for a discussion of state implementation of part 68.

EXHIBIT 1-1
EVALUATE FACILITY TO IDENTIFY COVERED PROCESSES



1.2 GENERAL PROVISIONS

The CAA applies this rule to any person who owns or operates a stationary source. "Person" is defined to include

"An individual, corporation, partnership, association, State, municipality, political subdivision of a state, and any agency, department, or instrumentality of the United States and any officer, agency, or employee thereof."

The rule, therefore, applies to all levels of government as well as private businesses.

CAA section 112(r)(2)(c) defines "stationary sources" as:

"Any buildings, structures, equipment, installations, or substance emitting stationary activities

- Which belong to the same industrial group,
- Which are located on one or more contiguous properties,
- Which are under the control of the same person (or persons under common control), and
- From which an accidental release may occur."

EPA has added some language in the rule to clarify issues related to transportation (see below).

FARMS (§68.125)

The rule has only one exemption: for ammonia when held by a farmer for use on a farm. This exemption applies to ammonia only when used as a fertilizer by a farmer. It does not apply to agricultural suppliers or the fertilizer manufacturer. It does not apply to farm cooperatives or to groups of farmers who buy, use, and sell ammonia. In the event that a farmer stores one or more other regulated substance above threshold quantities, that storage would be covered.

TRANSPORTATION ACTIVITIES

The rule applies only to stationary sources. Pipelines covered by DOT or under a state natural gas or hazardous liquid program for which the state has in effect a certification to DOT under 49 U.S.C. 6010.5 are not covered. Piping at your source, however, is covered. Storage of natural gas incident to transportation (i.e., gas taken from a pipeline during non-peak periods and placed in storage fields, then returned to the pipeline when needed) is not covered. Storage fields include, but are not limited to, depleted oil and gas reservoirs, aquifers, mines, or caverns. Liquefied natural gas facilities covered by 49 CFR part 193 are not covered.

QS & As
STATIONARY SOURCE

Q. What does "same industrial group" mean?

A. Operations at a site that belong to the same three-digit North American Industry Classification System (NAICS) code (which has replaced the old two-digit SIC codes) belong to the "same industrial group. In addition, where one or more operations at the site serve primarily as support facilities for the main operation at the site, the supporting operations are part of the "same industrial group" as the main operation. For example, if you manufacture chemicals (NAICS 325) and operate a waste treatment facility (NAICS 562) that handles primarily wastes generated by your chemical operations, the waste operation would be considered a support operation. If you operate a petrochemical manufacturing operation (NAICS 32511) next to your petroleum refinery (NAICS 32411), the two plants would be considered in different industrial groups and would require two RMPs unless the majority of the refinery's production was used by the chemical manufacturing plant.

Q. What does "contiguous property" mean?

A. Property that is adjoining. Public rights-of-way (e.g., railroads, highways) do not prevent property from being considered contiguous. Property connected only by rights-of-way are not considered contiguous (e.g., two plants with a connecting pipeline).

Q. What does "control of the same person" mean?

A. Control of the same person refers to corporate control, not site management. If two divisions of a corporation operate at the same site, even if each operation is managed separately, they will count as one source provided the other criteria are met because they are under control of the same company.

Transportation containers used for storage not incident to transportation and transportation containers connected to equipment at a stationary source are considered part of the stationary source. Transportation containers that have been unhooked from the motive power that delivered them to the site (e.g., truck or locomotive) and left on your site for short-term or long-term storage are part of your stationary source. For example, if you have railcars on a private siding that you use as storage tanks until you are ready to hook them to your process, these railcars should be considered to be part of your source. If a tank truck is being unloaded **and** the motive power is still attached, the truck and its contents are considered to be in transportation and not covered by the rule. You should count only the substances in the piping or hosing as well as the quantity unloaded. Some issues related to transportation are still under discussion with DOT.

RELATIONSHIP TO OSHA PROCESS SAFETY MANAGEMENT STANDARD EXEMPTIONS

The OSHA Process Safety Management (PSM) standard (29 CFR 1910.119) exempts retail facilities, substances used solely as a fuel if such substances are not part of a process containing another regulated substance, flammable liquids stored in

atmospheric storage tanks, and remote oil and gas productions; in addition state and local governments are not subject to federal OSHA standards. The OSHA exemptions do not apply or extend to EPA's Risk Management Program Rule. Your processes are not exempt from the Risk Management Program simply because they qualify for one of the OSHA exemptions. EPA's rule covers retail facilities, substances used as fuel, substances stored in atmospheric storage tanks, and state and local governments if they own or operate a facility where there is more than a threshold quantity in a process. As discussed in Section 1.5, most oil and gas production facilities as well as retail gas stations are not subject to the rule because the flammables are excluded from threshold determinations.

1.3 REGULATED SUBSTANCES AND THRESHOLDS (§68.130)

The list of substances regulated under § 68.130 is in Appendix A. Check the list carefully. If you do not have any of these substances (either as pure substances or in mixtures above 1 percent concentration) or do not have them above their listed threshold quantities, you do not need to read any further because you are not covered.

The list includes 77 chemicals that were listed because they are acutely toxic; they can cause serious health effects or death from short-term exposures. The list also covers 63 flammable gases and highly volatile flammable liquids. The flammable chemicals have the potential to form vapor clouds and explode or burn if released. The rule also covers flammable mixtures that include any of the listed flammables if the mixture meets the criteria for the National Fire Protection Association's (NFPA) 4 rating.

1.4 WHAT IS A PROCESS

The concept of "process" is key to whether you are subject to this rule. Process is defined in 40 CFR §68.3 as:

"Any activity involving a regulated substance, including any use, storage, manufacturing, handling, or on-site movement of such substances, or combination of these activities. For the purposes of this definition, any group of vessels that are interconnected, or separate vessels that are located such that a regulated substance could be involved in a potential release, shall be considered a single process."

"Vessel" in §68.3 means any reactor, tank, drum, barrel, cylinder, vat, kettle, boiler, pipe, hose, or other container.

EPA's definition of process is identical to the definition of process under the OSHA PSM standard. Understanding the definition of process is important in determining whether you have a threshold quantity of a regulated substance and what level of requirements you must meet if the process is covered.

What does this mean to you?

- If you store a regulated substance in a single vessel in quantities above the threshold quantity, you are covered.

- If you have interconnected vessels that altogether hold more than a threshold quantity, you are covered. The connections need not be permanent. If two or

more vessels are connected occasionally, they are considered a single process for the purposes of determining whether a threshold quantity is present.

- If you have multiple unconnected vessels, containing the same substance, you will have to determine whether they need to be considered together as co-located.

A process can be as simple as a single storage vessel or a group of drums or cylinders in one location or as complicated as a system of interconnected reactor vessels, distillation columns, receivers, pumps, piping, and storage vessels.

SINGLE VESSELS

If you have only a single vessel containing regulated substances, you need not worry about the other possibilities for defining a process and can skip to section 1.5. For the purposes of defining a threshold quantity, you need only consider the quantity in this vessel.

INTERCONNECTED VESSELS

In general, if you have two or more vessels containing a regulated substance that are connected through piping or hoses for the transfer of the regulated substance, you must consider the total quantity of a regulated substance in all the connected vessels and piping when determining if you have a threshold quantity in a process. If the vessels are connected for transfer of the substance using hoses that are sometimes disconnected, you still have to consider the contents of the vessels as one process, because if one vessel were to rupture while the hose was attached or the hose were to break during the transfer, both tanks could be affected. Therefore, you must count the quantities in both tanks and in any connecting piping or hoses. You cannot consider the presence of automatic shutoff valves or other devices that can limit flow, because these are assumed to fail for the purpose of determining the total quantity in a process.

Once you have determined that a process is covered (the quantity of a regulated substance exceeds its threshold), you must also consider equipment, piping, hoses, or other interconnections that do not carry or contain the regulated substance, but that are important for accidental release prevention. Equipment or connections which contain utility services, process cooling water, steam, electricity, or other non-regulated substances may be considered part of a process if such equipment could cause a regulated substance release or interfere with mitigating the consequences of an accidental release. Your prevention program for this process (e.g., PSM program) will need to cover such equipment. If, based on your analysis, it is determined that interconnected equipment or connections not containing the regulated substance cannot cause a regulated substance release or interfere with mitigation of the consequences of such a release, then such equipment or connections could safely be considered outside the limits or boundaries of the covered process.

In some cases, such as in a large refinery or multi-unit chemical plant, determining the boundaries of a process for purposes of the RMP rule may be complicated. In the preamble to the June 20, 1996 rule (61 FR 31668), EPA clearly stated its intent to be consistent with OSHA's interpretation of "process" as that term is used in OSHA's

PSM rule. Therefore, if your facility is subject to the PSM rule, the limits of your process(es) for purposes of OSHA PSM will be the limits of your process(es) for purposes of RMP (except in cases involving atmospheric storage tanks containing flammable regulated substances, which are exempt from PSM but not RMP). If your facility is not covered by OSHA PSM and is complicated from an engineering perspective, you should consider contacting your implementing agency for advice on determining process boundaries.

CO-LOCATION

The third possibility you must consider is whether you have separate vessels that contain the same regulated substance that are located such that they could be involved in a single release. If so, you must add together the total quantity in all such vessels to determine if you have more than a threshold quantity. This possibility will be particularly important if you store a regulated substance in cylinders or barrels or other containers in a warehouse or outside in a rack. In some cases, you may have two vessels or systems that are in the same building or room. For each of these cases, you should ask yourself:

- Could a release from one of the containers lead to a release from the other? For example, if a cylinder of propane were to rupture and burn, would the fire spread to other propane cylinders?

- Could an event external to the containers, such as a fire or explosion or collapse of collision (e.g., a vehicle collides with several stored containers), have the potential to release the regulated substance from multiple containers?

You must determine whether there is a credible scenario that could lead to a release of a threshold quantity.

For flammables, you should consider the distance between vessels. If a fire could spread from one vessel to others or an explosion could rupture multiple vessels, you must count all of them. For toxics, a release from a single vessel will not normally lead to a release from others unless the vessel fails catastrophically and explodes, sending metal fragments into other vessels. Co-located vessels containing toxic substances, however, may well be involved in a release caused by a fire or explosion that occurs from another source. The definition of process is predicated on the assumption that explosion will take place. In addition, a collapse of storage racks could lead to multiple vessels breaking open.

If the vessels are separated by fire walls or barricades that will contain the blast waves from explosions of the substances, you will not need to count the separated vessels, but you would count any that are in the same room.

You may not dismiss the possibility of a fire spreading based on an assumption that your fire brigade will be able to prevent any spread. You should ask yourself how far the fire would spread if the worst happens — the fire brigade is slow to arrive, the water supply fails, or the local fire department decides it is safer to let the fire burn itself out. If you have separate vessels containing a regulated substance that could be affected by the same accident, you should count them as a single process.

PROCESSES WITH MULTIPLE CHEMICALS

When you are determining whether you have a covered process, you should not limit your consideration to vessels that have the same regulated substance. A covered process includes any vessels that altogether hold more than a threshold quantity of regulated substances and that are interconnected or co-located. Therefore, if you have four storage or reactor vessels holding four different regulated substances above their individual thresholds and they are located close enough to be involved in a single event, they are considered a single process. One implication of this approach is that if you have two vessels, each containing slightly less than a threshold quantity of the same regulated substance and located a considerable distance apart, and you have other storage or process vessels in between with other regulated substances above their thresholds, the two vessels with the first substance may be considered to be part of a larger process involving the other intervening vessels and other regulated substances, based on co-location.

Exhibit 1-2 provides illustrations of what may be defined as a process.

DIFFERENCES WITH OSHA

OSHA aggregates different flammable liquids across vessels in making threshold determinations; OSHA also aggregates different flammable gases (but does not aggregate flammable liquids with flammable gases); EPA aggregates neither. Therefore, if you have three co-located or connected reactor vessels each containing 5,000 pounds of a different flammable liquid, OSHA considers that you have 15,000 pounds of flammable liquids and are covered by the PSM standard. Under EPA's rule, you would not have a covered process because you do not meet the threshold quantity for any one of the three substances. OSHA, like EPA, does not aggregate quantities for toxics as a class (i.e., each toxic substance must meet its own threshold quantity).

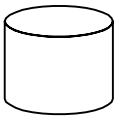
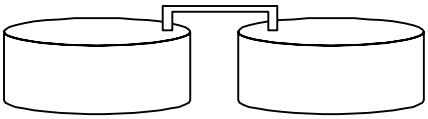
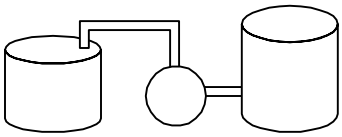
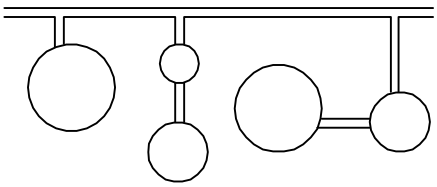
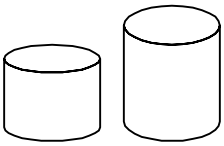
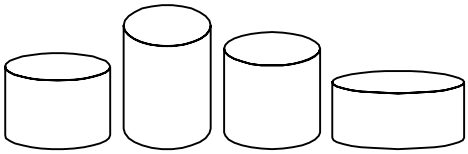
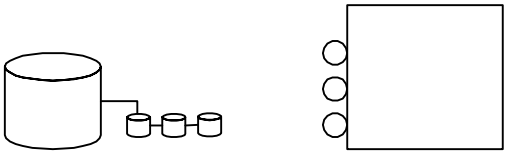
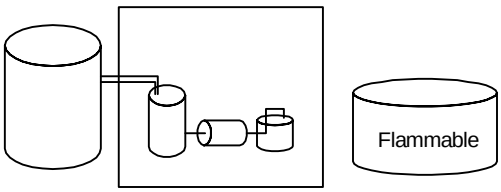
1.5 THRESHOLD QUANTITY IN A PROCESS

The threshold quantity for each regulated substance is listed in 40 CFR §68.30, in Appendix A. You should determine whether the maximum quantity of each substance in a process is greater than the threshold quantity listed. If it is, you must comply with this rule for that process. Even if you are not covered by this rule, you may still be subject to reporting requirements under the Emergency Planning and Community Right to Know Act (EPCRA).

QUANTITY IN A VESSEL

To determine if you have the threshold quantity of a regulated substance in a vessel involved in a single process, you need to consider the maximum quantity in that vessel at any one time. You do not need to consider the vessel's maximum capacity if you never fill it to that level. Base your decision on the actual maximum quantity that you may have in the vessel. Your maximum quantity may be more than your normal operating maximum quantity; for example, if you may use a vessel for emergency storage, the maximum quantity should be based on the quantity that might be stored.

EXHIBIT 1-2
PROCESS

Schematic Representation	Description	Interpretation
	1 vessel 1 regulated substance above TQ	1 process
	2 or more connected vessels *same* regulated substance above TQ	1 process
	2 or more connected vessels *different* regulated substances each above TQ	1 process
	pipeline feeding multiple vessels total above TQ	1 process
	2 or more vessels co-located *same* substance total above TQ	1 process
	2 or more vessels co-located *different* substances each above TQ	1 process
	2 vessels, located so they won't be involved in a single release *same* or *different* substances each above TQ	2 processes
	2 locations with regulated substances each above TQ	1 or 2 processes depending on distance
	1 series of interconnected vessels *same* or *different* substances above TQs *plus* a co-located storage vessel containing flammables	1 process

AGGREGATION OF SUBSTANCES

A toxic substance is never aggregated with a different toxic substance to determine whether a threshold quantity is present. If your process consists of co-located vessels with different toxic substances, you must determine whether each substance exceeds its threshold quantity.

A flammable substance in one vessel is never aggregated with a different flammable substance in another vessel to determine whether a threshold quantity is present. However, if a flammable mixture meets the criteria for NFPA-4 and contains different regulated flammables, it is the mixture, not the individual substances, that is considered in determining if a threshold quantity is present.

"At any one time" means you need to consider the largest quantity that you ever have in the vessel. If you fill a tank with 50,000 pounds and immediately begin using the substance and depleting the contents, your maximum is 50,000 pounds.

If you fill the vessel four times a year, your maximum is still 50,000 pounds. Throughput is not considered because the rule is concerned about the maximum quantity you could release in a single event.

QUANTITY IN A PIPELINE

The maximum quantity in a pipeline will generally be the capacity of the pipeline (volume). In most cases, pipeline quantity will be calculated and added to the interconnected vessels.

INTERCONNECTED/CO-LOCATED VESSELS

If your process consists of two or more interconnected vessels, you must determine the maximum quantity for each vessel and the connecting pipes or hoses. The maximum for each individual vessel and pipe is added together to determine the maximum for the process.

If you have determined that you must consider co-located vessels as one process, you must determine the maximum quantity for each vessel and sum up the quantities of all such vessels.

QUANTITY OF A SUBSTANCE IN A MIXTURE

TOXICS WITH LISTED CONCENTRATION

Four toxic substances have listed concentrations in the rule: hydrochloric acid — 37 percent or greater; hydrofluoric acid — 50 percent or greater; nitric acid — 80 percent or greater; and ammonia — 20 percent or greater.

- If you have these substances in solution and their concentration is less than the listed concentration, you do not need to consider them at all.

- If you have one of these four above their listed concentration, you must determine the weight of the substance in the solution and use that to calculate the quantity present. If that quantity is greater than the threshold, the process is covered. For example, aqueous ammonia is covered at concentrations above 20 percent, with a threshold quantity of 20,000 pounds. If the solution is 25 percent ammonia, you would need 80,000 pounds of the solution to meet the threshold quantity; if the solution is 44 percent ammonia, you would need 45,455 pounds to meet the threshold quantity (quantity of mixture x percentage of regulated substance = quantity of regulated substance).

QS & AS
PROCESS

Q. Do I have to do my hazard review, process hazard analysis, or other prevention activity on the whole process or can I break it into separate units?

A. Once you have determined that you have a covered process, you can divide the covered process any way you want to implement the prevention program. If you have multiple interconnected storage and reactor vessels in your process, you may want to treat them separately when you conduct the hazard review or process hazard analysis, if only to make the analyses easier to manage. Storage and reactor vessels may require separate maintenance programs. You should do what makes sense for you.

Q. How far apart do separate vessels have to be to be considered different processes?

A. There is no hard and fast rule for how great this distance should be before you do not need to consider the vessels as part of one process. Two vessels at opposite ends of a large warehouse room might have to be considered as one process if the entire warehouse or room could be engulfed in a fire. Two vessels separated by the same distance out of doors might be far enough apart that a fire affecting one would be unlikely to spread to the other. You may want to consult with your local fire department. You should then use your best professional judgment. Ask yourself how much of the regulated substance could be released if the worst happens (you have a major fire, an explosion, a natural disaster).

Note that in a revision to part 68, EPA changed the concentration for hydrochloric acid to 37 percent or greater (see Appendix A).

TOXICS WITHOUT A LISTED CONCENTRATION

For toxics without a listed concentration, if the concentration is less than one percent you need not consider the quantity in your threshold determination. If the concentration in a mixture is above one percent, you must calculate the weight of the regulated substance in the mixture and use that weight to determine whether a threshold quantity is present. However, if you can measure or estimate (and document) that the partial pressure of the regulated substance in the mixture is less than 10 mm Hg, you do not need to consider the mixture. Note that the partial pressure rule does not apply to toluene diisocyanate (2-4, 2-6, or mixed isomers) or oleum.

EPA treats toxic mixtures differently from OSHA. Under the OSHA PSM standard, the entire weight of the mixture is counted toward the threshold quantity; under part 68, only the weight of the toxic substance is counted.

FLAMMABLES

Flammable mixtures are subject to the rule only if there is a regulated substance in the mixture above one percent and the entire mixture meets the NFPA-4 criteria. If the mixture meets both of these criteria, you must use the weight of the entire mixture (not just the listed substance) to determine if you exceed the threshold quantity. The NFPA-4 definition is as follows:

"Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and that will burn readily. This degree usually includes:

FLAMMABLE GASES

Flammable cryogenic materials

Any liquid or gaseous material that is liquid while under pressure and has a flash point below 73 F (22.8 C) and a boiling point below 100 F (37.8 C) (i.e., Class 1A flammable liquids)

Materials that will spontaneously ignite when exposed to air."

FLAMMABLES NOT COVERED BY PART 68 (§68.115)

The following flammables are not considered part of a "stationary source" and, therefore, any regulated substances contained in them need not be included in your calculations of threshold quantities:

- Naturally occurring hydrocarbon reservoirs; and
- Naturally occurring hydrocarbon transportation subject to oversight or regulation under a state natural gas or hazardous liquid program for which the state has in effect a certification to DOT under 49 U.S.C. 60105.

"Naturally occurring hydrocarbon reservoirs" includes oil and gas fields, where the hydrocarbons occur in nature and from which they are pumped; it does not include natural formations, such as salt domes, where hydrocarbons are stored after they have been produced or processed. Transportation subject to state oversight or regulation refers to transportation in pipelines.

You do not need to consider the following flammable substances when you determine the applicability of the rule:

- Gasoline, when in distribution or related storage for use as fuel for internal combustion engines;

- Naturally occurring hydrocarbon mixtures prior to entry into a petroleum refining process unit (NAICS code 32411) or a natural gas processing plant (NAICS code 211112). Naturally occurring hydrocarbon mixtures include any of the following:

- Condensate - hydrocarbon liquid separated from natural gas that condenses because of changes in temperature, pressure, or both, and that remains liquid at standard conditions;

- Crude oil - any naturally occurring, unrefined petroleum liquid;

- Field gas - gas extracted from a production well before the gas enters a natural gas processing plant (any processing site engaged in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural gas products, or both); and

- Produced water - water extracted from the earth from an oil or natural gas production well, or that is separated from oil or natural gas after extraction.

EXCLUSIONS (§68.115)

The rule has a number of exclusions that allow you to ignore certain items that contain a regulated substance when you determine whether a threshold quantity is present. Note that these same exclusions apply to EPCRA section 313; you may be familiar with them if you comply with that provision.

ARTICLES (§68.115(b)(4))

You do not need to include in your threshold calculations any manufactured item defined at §68.3 (as defined under 29 CFR 1910.1200(b)) that:

- Is formed to a specific shape or design during manufacture,

- Has end use functions dependent in whole or in part upon the shape or design during end use, and

- Does not release or otherwise result in exposure to a regulated substance under normal conditions of processing and use.

USES (§68.115(b)(5))

You also do not need to include regulated substances in your calculation when in use for the following purposes:

- Use as a structural component of the stationary source;

- Use of products for routine janitorial maintenance;

- Use by employees of foods, drugs, cosmetics, or other personal items containing the regulated substances; and

- Use of regulated substances present in process water or non-contact cooling water as drawn from the environment or municipal sources, or use of regulated substances present in air used either as compressed air or as part of combustion.

ACTIVITIES IN LABORATORIES

If a regulated substance is manufactured, processed, or used in a laboratory at a stationary source under the supervision of a technically qualified individual (as defined by § 720.3 (ee) of 40 CFR), the quantity of the substance need not be considered in determining whether a threshold quantity is present. This exclusion does not extend to:

- Specialty chemical production;
- Manufacture, processing, or use of substances in pilot plant scale operations; and
- Activities conducted outside the laboratory.

1.6 STATIONARY SOURCE

The rule applies to "stationary sources" and each stationary source with one or more covered processes must file an RMP that includes all covered processes.

SIMPLE SOURCES

For most facilities covered by this rule, determining what constitutes a “stationary source” is simple. If you own or lease a property, your processes are contained within the property boundary, and no other companies operate on the property, then your stationary source is defined by the property boundary and covers any process within the boundaries that has more than a threshold quantity of a regulated substance. You must comply with the rule and file a single RMP for all covered processes.

MULTIPLE OPERATIONS OWNED BY A SINGLE COMPANY

If the property is owned or leased by your company, but several separate operating divisions of the company have processes at the site, the divisions’ processes may be considered a single stationary source because they are controlled by a single company. Two factors will determine if the processes are to be considered a single source: Are the processes located on one or more contiguous properties? Are all of the operations in the same industrial group?

If your company does have multiple operations that are on the same property and are in the same industrial group, each operating division may develop its prevention program separately for its covered processes, but you must file a single RMP for all covered processes at the site. You should note that this is different from the requirements for filing under CAA Title V, and EPCRA section 313 (the annual toxic release inventory), where each division could file separately if your company chose to do so.

OTHER SOURCES

There are situations where two or more separate companies occupy the same site. The simplest of these cases is if multiple companies lease land at a site (e.g., an industrial park). Each company that has covered processes must file an RMP that includes information on its own covered processes at the site. You are responsible for filing an RMP for any operations that you own or operate.

Another possibility is that one company owns the land and operates there while leasing part of the site to a second company. If both companies have covered processes, each is considered a separate stationary source and must file separate RMPs even if they have contractual relationships, such as supplying product to each other or sharing emergency response functions.

If you and another company jointly own a site, but have separate operations at the site, you each must file separate RMPs for your covered processes. Ownership of the land is not relevant; a stationary source consists of covered processes located on the same property and controlled by a single owner.

JOINT VENTURES

You and another company may jointly own covered processes. In this case, the legal entity you have established to operate these processes should file the RMP. If you consider this entity a subsidiary, you should be listed as the parent company in the RMP.

MULTIPLE LOCATIONS

If you have multiple operations in the same area, but they are not on physically connected land, you must consider them separate stationary sources and file separate RMPs for each, even if the sites are connected by pipelines that move chemicals among the sites. Remember, the rule applies to covered processes at a single location.

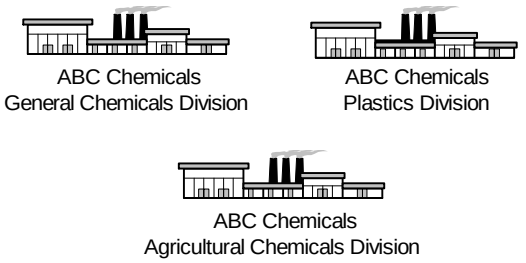
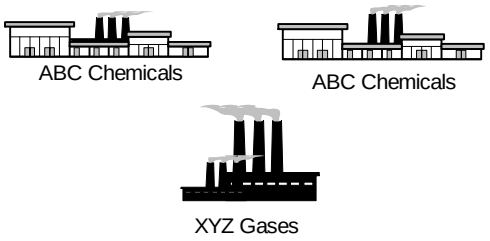
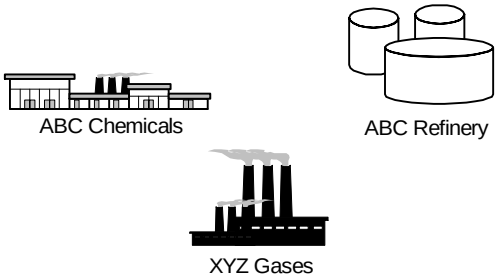
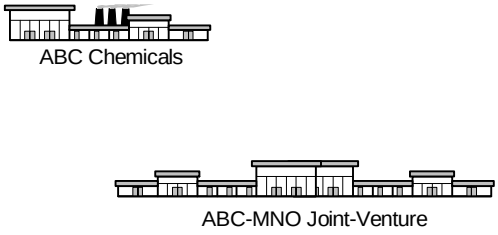
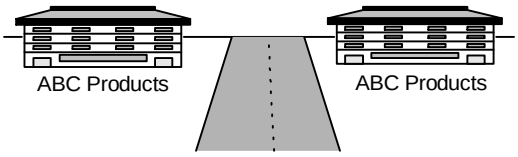
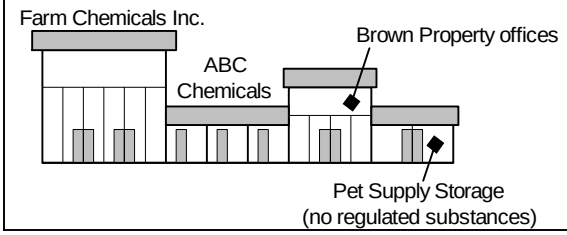
Exhibit 1-3 provides examples of stationary source decisions.

1.7 WHEN YOU MUST COMPLY

Prior to June 21, 1999, if you determine that you have a covered process, you must comply with the requirements of part 68 no later than June 21, 1999. This means that if you have the process now or start it on June 1, 1999, you must be in compliance with the rule on June 21, 1999. By that time you must have developed and implemented all of the elements of the rule that apply to each of your covered processes, and you must submit an RMP to EPA in a form and manner that EPA will specify prior to that time.

If the first time you have a covered process is after June 21, 1999, or you bring a new process on line after that date, you must comply with part 68 no later than the date on which you first have more than a threshold quantity of a regulated substance in a process.

EXHIBIT 1-3
STATIONARY SOURCE

Schematic Representation	Description	Interpretation
	*same* owner *same* industrial group	1 stationary source 1 RMP
	two owners	2 stationary sources 2 RMPs 1 ABC 1 XYZ
	two owners three industrial groups	3 stationary sources 1 ABC Chemicals 1 ABC Refinery 1 XYZ Gases
	two owners	2 stationary sources 2 RMPs
	*same* owner *same* industrial group contiguous property	1 stationary source 1 RMP
Building owned by Brown Properties 	two owners	2 stationary sources 2 RMPs 1 ABC Chemicals 1 Farm Chemicals

QS & AS
STATIONARY SOURCE

Q. I operate a single covered process on a site owned by a large company. I manufacture a regulated substance that I pipe to the other company for use in its processes. At what point do the piping and substance become part of the other company's stationary source?

A. The answer will vary. The company that owns and maintains the piping should probably consider it part of its stationary source. If, however, there is a point (e.g., a valve or meter) where the receiving company is considered to take ownership of the substance, then you may decide to divide the piping and its contents at that point.

Q. The definition of process would seem to say that my process is part of the larger company's process because they are interconnected. Why can't the larger company just include my process in its RMP?

A. Your process is not part of the larger company's stationary source because it does not meet the statutory criteria for stationary sources. Although the process may be part of the same industrial group and is at the same location, it is not under control of the same person. Therefore, the process is a separate stationary source and must have a separate RMP.

QS & AS
COMPLIANCE DATES

Q. What happens if I bring a new covered process on line (e.g., install a second storage tank) after June 21, 1999?

A. For a new covered process added after the initial compliance date, you must be in compliance on the date you first have a regulated substance above the threshold quantity. There is no grace period. You must develop and implement all the applicable rule elements and update your RMP before you start operating the new process.

Q. What if EPA lists a new substance?

A. You will have three years from the date on which the new listing is effective to come into compliance for any process that is covered because EPA has listed a new substance.

Q. What if I change a process by adding new reactor vessels, but do not change the substances?

A. Because increasing the number of reactor vessels is a major change to your process, you will have six months to come into compliance and update your RMP to reflect changes in your prevention program elements and report any other changes.

Q. What if the quantity in the process fluctuates? I may not have a threshold quantity on June 21, 1999, but I will before then and after then.

A. You do not need to comply with the rule and file an RMP until you have more than threshold quantity in a process; however, once you have more than threshold quantity in a process after June 21, 1999, you must be in compliance immediately. In this situation, with fluctuating quantities, it may be prudent to file by June 21, 1999, so you will be in compliance when your quantity exceeds the threshold.

CHAPTER 2: APPLICABILITY OF PROGRAM LEVELS

2.1 WHAT ARE PROGRAM LEVELS?

Once you have decided that you have one or more processes subject to this rule (see Chapter 1), you need to identify what actions you must take to comply. The rule defines three Program levels based on processes' relative potential for public impacts and the level of effort needed to prevent accidents. For each Program level, the rule defines requirements that reflect the level of risk and effort associated with the processes at that level. The Program levels are as follows:

> **Program 1:** Processes with no public receptors within the distance to an endpoint from a worst-case release and with no accidents with specific offsite consequences within the past five years are eligible for Program 1, which imposes limited hazard assessment requirements and minimal prevention and emergency response requirements.
>
> **Program 2:** Processes not eligible for Program 1 or subject to Program 3 are placed in Program 2, which imposes streamlined prevention program requirements, as well as additional hazard assessment, management, and emergency response requirements.
>
> **Program 3:** Processes not eligible for Program 1 and either subject to OSHA's PSM standard under federal or state OSHA programs or classified in one of nine specified Standard Industrial Classification (SIC) codes are placed in Program 3, which imposes OSHA's PSM standard as the prevention program as well as additional hazard assessment, management, and emergency response requirements.

If you can qualify a process for Program 1, it is in your best interests to do so, even if the process is already subject to OSHA PSM. For Program 1 processes, the implementing agency will enforce only the minimal Program 1 requirements. If you assign a process to Program 2 or 3 when it might qualify for Program 1, the implementing agency will enforce all the requirements of the higher program levels. If, however, you are already in compliance with the prevention elements of Program 2 or Program 3, you may want to use the RMP to inform the community of your prevention efforts.

KEY POINTS TO REMEMBER

In determining program level(s) for your process(es), keep in mind the following:

(1) **Each process is assigned to a program level,** which indicates the risk management measures necessary to comply with this regulation for that process, not the facility as a whole. The eligibility of one process for a program level does not influence the eligibility of other covered processes for other program levels.

(2) **Any process that meets the criteria for Program 1 can be assigned to Program 1**, even if it is subject to OSHA PSM or is in one of the SIC codes listed for Program 3.

(3) **Program 2 is the default program level.** There are no "standard criteria" for Program 2. Any process that does not meet the criteria for either Programs 1 or 3 is subject to the requirements for Program 2.

(4) **Only one Program level can apply to a process.** If a process consists of multiple production or operating units or storage vessels, the highest Program level that applies to any segment of the process applies to all parts.

Q & A
PROCESS AND PROGRAM LEVEL

Q. My process includes a series of interconnected units, as well as several storage vessels that are co-located. Several sections of the process could qualify for Program 1. Can I divide my process into sections for the purpose of assigning Program levels?

A. No, you cannot subdivide a process for this purpose. The highest Program level that applies to any section of the process is the Program level for the whole process. If the entire process is not eligible for Program 1, then the entire process must be assigned to Program 2 or Program 3.

2.2 PROGRAM 1

WHAT ARE THE ELIGIBILITY REQUIREMENTS?

Your process is eligible for Program 1 if:

(1) There are no public receptors within a distance to an endpoint from a worst-case release;

(2) The process has had no release of a regulated substance in the past five years where exposure to the substance, its reaction products, overpressures generated by explosion involving the substance, or radiant heat from a fire involving the substance resulted in one or more offsite deaths, injuries, or response or restoration activities for exposure of an environmental receptor; and

(3) You have coordinated your emergency response activities with the local responders. (This requirement applies to any covered process, regardless of program level.)

WHAT IS A PUBLIC RECEPTOR?

The rule (§ 68.3) defines **public** as "any person except an employee or contractor of the stationary source." Consequently, employees of other facilities that may share

your site are considered members of the public even if they share the same physical location. Being "the public," however, is not the same as being a public receptor.

Public receptors include "offsite residences, institutions (e.g., schools and hospitals), industrial, commercial, and office buildings, parks, or recreational areas inhabited or occupied by the public at any time without restriction by the stationary source where members of the public could be exposed to toxic concentrations, radiant heat, or overpressure, as a result of an accidental release." **Offsite** means areas beyond your property boundary and "areas within the property boundary to which the public has routine and unrestricted access during or outside business hours."

The first step in identifying public receptors is determining what is "offsite." For most facilities, that determination will be straightforward. If you restrict access to all of your property all of the time, "offsite" is anything beyond your property boundaries. Ways of restricting access include fully fencing the property, placing security guards at a reception area or using ID badges to permit entry.

If you do not restrict access to a section of your property and the public has routine and unrestricted access to it during or after business hours, that section would be "offsite." For example, if your operations are fenced but the public has unrestricted access to your parking lot during or after business hours, the parking lot is "offsite." In the case of facilities such as hospitals, schools, and hotels that shelter members of the public as part of their function or business, the parts of the facility that are used to shelter the public would be "offsite."

Not all areas offsite are potential public receptors. The point of identifying public receptors is to locate those places where there are likely to be, at least some of the time, members of the public whose health could be harmed by short-term exposure to an accidental release at your site. The basic test for identifying a public receptor is thus whether an area is a place where it is reasonable to expect that members of the public will routinely gather at least some of the time.

The definition of "public receptor" itself specifies the types of areas where members of the public may routinely gather at least some of the time: residences, institutions such as hospitals and schools, buildings in general, parks and recreational areas. There should be little difficulty in identifying residences, institutions and businesses as such, and virtually any residence, institution and business will qualify as a public receptor, even when the property is used only seasonally (as in a vacation home). Notably, a residence includes its yard, if any, and an institution or business includes its grounds to the extent that employees or other members of the public are likely to routinely gather there at least some of the time for business or other purposes (see discussion of recreational areas below). The only circumstances that would justify not considering such a property a public receptor would be where your facility owns or controls the property and restricts access to it, or no member of the public inhabits or occupies it at any time. Where a hospital, school, hotel or other entity that provides public shelter is itself subject to the part 68 rule (e.g., because of on-site propane storage tanks), it will be its own public receptor except for those areas where members of the public are not allowed to go at any time.

Buildings other than residences, institutions or businesses are also highly likely to qualify as public receptors since the function of most buildings is at least in part to shelter people. Accordingly, toll booth plazas, transit stations, and airport terminals would qualify as public receptors. For a building not to qualify as a public receptor, one of the circumstances mentioned above would have to apply.

Every designated park or recreational area, or at least some portion thereof, is apt to be a public gathering place by virtue of facilities made available to the public (e.g., visitors' center, playground, golf course, camping or picnic area, marina or ball field) or attributes that members of the public routinely seek to use (e.g., beach). It does not matter whether use of such facilities is seasonal; routine use for at least part of the year would qualify the area as a public receptor.

At the same time, some portion of a designated park or recreational area may not be a public receptor. For instance, a large state or national park may include relatively inaccessible tracts of land that do not contain public facilities or receive routine use. Occasional hiking, camping or hunting in such areas would not qualify the areas as public receptors.

An area need not be designated a recreational area to be one in fact. If an area is routinely used for recreational purposes, even if only seasonally, it is a recreational area for purposes of the part 68 rule. For example, a marina may not bill itself as a "recreational area," but if a marina houses recreational boats, it qualifies as a public receptor. Further, if your facility or a neighboring property owner allows the public to make routine recreational use of some portion of land (e.g., a ball field or fishing pond), that portion of land would qualify as a public receptor.

Roads and parking lots are not included as such in the definition of "public receptor." Neither are places where people typically gather; instead they are used to travel from one place to another or to park a vehicle while attending an activity elsewhere. However, if a parking lot is predictably and routinely used as a place of business (e.g., a farmer's market) or for a recreational purpose (e.g., a county fair), it would qualify as a public receptor.

In general, farm land would not be considered a public receptor. However, if farm land, or a portion thereof, is predictably and routinely occupied by farm workers or other members of public, even if only on a seasonal basis, that portion of the land would be a public receptor.

If you are in doubt about whether to consider certain areas around your facility as public receptors, you should consult with the relevant local officials and land owners and your implementing agency for guidance.

WHAT IS A DISTANCE TO AN ENDPOINT FROM A WORST-CASE RELEASE?

In broad terms, the distance to an endpoint is the distance a toxic vapor cloud, fire, or explosion from an accidental release will travel before dissipating to the point that serious injuries from short-term exposures will no longer occur. The rule establishes "endpoints" for each regulated substance and defines the circumstances of a

QS & AS
PUBLIC RECEPTORS

Q. My processes are fenced, but my offices and parking lot for customers are not restricted. What is considered offsite? What is considered a public receptor?

A. The unrestricted areas would be considered offsite. However, they would not be public receptors because you are responsible for the safety of those who work in or visit your offices and because parking lots are not generally public receptors.

Q. What is considered a recreational area?

A. Recreational areas would include land that is designed, constructed, designated, or used for recreational activities. Examples are national, state, county, or city parks, other outdoor recreational areas such as golf courses or swimming pools and bodies of waters (oceans, lakes, rivers, and streams) when used by the public for fishing, swimming, or boating. Public and private areas that are predictably used for hunting, fishing, bird watching, bike riding, hiking, or camping or other recreational use also would be considered recreational areas. EPA encourages you to consult with land owners, local officials, and the community to reach an agreement on an area's status; your local emergency planning committee (LEPC) can help you with these consultations. EPA recognizes that some judgment is involved in determining whether an area should be considered a recreational area.

Q. Does public receptor cover only buildings on a property or the entire property? If the owner of the land next to my site restricts access to the land, is it still a public receptor?

A. Public receptors are not limited to buildings. For example, if there are houses near your property, both the houses and their yards are considered public receptors because it is likely that residents will be present in one or the other at least some of the time, and, in fact, people are likely to be in more danger if they are outside when a release occurred. The ability of others to restrict access to an area does not change its status as a public receptor. You need to consider whether that land is generally unoccupied. If the land is undeveloped or rarely has anyone on it, it is not a public receptor. If you are not sure of the land's use of occupancy, you should talk with the landowner and the community about its status. Because it is the landowner and members of the local community who are likely to be affected by your decision, you should involve them in the decision is you have doubts.

worst-case release scenario (e.g., scenario, weather, release rate and duration) (see Chapter 4 or the RMP Offsite Consequence Analysis Guidance for more information). You will have to define a worst-case release (usually the loss of the total contents of your largest vessel) for each Program 1 process and either use EPA's guidance or conduct modeling on your own to determine the distance to the endpoint for that worst-case release. Beyond that endpoint, the effects on people are not considered to be severe enough to merit the need for additional action under this rule.

To define the area of potential impact from the worst-case release, draw a circle on a map, using the process as the center and the distance to the endpoint as the radius. If there are public receptors within that area, your process is not eligible for Program 1.

ACCIDENT HISTORY

To be eligible for Program 1, no release of the regulated substance from the process can have resulted in one or more offsite deaths, injuries, or response or restoration activities at an environmental receptor during the five years prior to submission of your RMP. A release of the regulated substance from another process has no bearing on whether the first process is eligible for Program 1.

WHAT IS AN INJURY?

An injury is defined as "any effect on a human that results either from direct exposure to toxic concentrations; radiant heat; or overpressures from accidental releases or from the direct consequences of a vapor cloud explosion (such as flying glass, debris, and other projectiles) from an accidental release." The effect must "require medical treatment or hospitalization." This definition is taken from the OSHA regulations for keeping employee injury and illness logs and should be familiar to most employers. Medical treatment is further defined as “treatment, other than first aid, administered by a physician or registered professional personnel under standing orders from a physician.” The definition of medical treatment will likely capture most instances of hospitalization. However, if someone goes to the hospital following direct exposure to a release and is kept overnight for observation (even if no specific injury or illness is found), that would qualify as hospitalization and so would be considered an injury.

WHAT IS AN ENVIRONMENTAL RECEPTOR?

The environmental receptors you need to consider are limited to natural areas such as national or state parks, forests, or monuments; officially designated wildlife sanctuaries, preserves, refuges, or areas; and Federal wilderness areas. All of these areas can be identified on local U.S. Geological Survey maps.

WHAT ARE RESTORATION AND RESPONSE ACTIVITIES?

The type of restoration and response activity conducted to address the impact of an accidental release will depend on the type of release (volatilized spill, vapor cloud, fire, or explosion), but may include such activities as:

- Collection and disposal of dead animals and contaminated plant life;
- Collection, treatment, and disposal of soil;
- Shutoff of drinking water;
- Replacement of damaged vegetation; or
- Isolation of a natural area due to contamination associated with an accidental release.

Q & A
ENVIRONMENTAL RECEPTORS

Q. Do environmental receptors include areas that are not Federal Class I areas under the CAA?

A. Yes. The list of environmental receptors in Part 68 includes areas in addition to those that qualify as Federal Class I areas under CAA section 162. Under Part 68, national parks, monuments, wilderness areas, and forests are environmental receptors regardless of size. State parks, monuments, and forests are also environmental receptors.

DOCUMENTING PROGRAM 1 ELIGIBILITY

For every Program 1 process at your facility, you must keep records documenting the eligibility of the process for Program 1. For each Program 1 process, your records should include the following:

- A description of the worst-case release scenario, which must specify the vessel or pipeline and substance selected as worst case, assumptions and parameters used, and the rationale for selection. Assumptions may include use of any administrative controls and any passive mitigation that were assumed to limit the quantity that could be released;
- Documentation of the estimated quantity of the worst-case release, release rate, and duration of release;
- The methodology used to determine distance to endpoints;
- Data used to determine that no public receptor would be affected; and
- Information on your coordination with public responders.

2.3 QUICK RULES FOR DETERMINING PROGRAM 1 ELIGIBILITY

You generally will not be able to predict with certainty that the worst-case scenario for a particular process will meet the criteria for Program 1. Processes containing certain substances, however, may be more likely than others to be eligible for Program 1, and processes containing certain other substances may be very unlikely to be eligible for Program 1 because of the toxicity and physical properties of the substances. The information presented below may be useful in identifying processes that may be eligible for Program 1.

QS & AS
ACCIDENT HISTORY

Q. What is the relationship between the accident history criteria for Program 1 and the five-year accident history? If my process is eligible for Program 1, do I still need to do a five-year accident history?

A. The five-year accident history is an information collection requirement that is designed to provide data on all serious accidents from a covered process involving a regulated substance held above the threshold quantity.

In contrast, the Program 1 accident history criteria focus on whether the process in question has the potential to experience a release of the regulated substance that results in harm to the public based on past events. Onsite effects, shelterings-in-place, and evacuations that have occurred must be reported in the five-year accident history, but they are not considered in determining Program 1 eligibility. Therefore, it is possible for process to be eligible for Program 1 and still have experienced a release that must be reported in the accident history for the source.

Q. A process with more than a threshold quantity of a regulated substance had an accident with offsite consequences three years ago. After the accident, we altered the process to reduce the quantity stored on site. Now the worst-case release scenario indicates that there are no public receptors within the distance to an endpoint. Can this process qualify for Program 1?

A. No, the process cannot qualify for Program 1 until five years have passed since any accident with consequences that disqualify a process for Program 1.

Q. A process involving a regulated substance had an accidental release with offsite consequences two years ago. The process has been shut down. Do I have to report anyway?

A. No. The release does not have to be included in your accident history. Your risk management plan only needs to address operating processes that have more than a threshold quantity of a regulated substance.

TOXIC GASES

If you have a process containing more than a threshold quantity of any regulated toxic gas that is not liquefied by refrigeration alone (i.e., you hold it as a gas or liquefied under pressure), the distance to the endpoint estimated for a worst-case release of the toxic gas will generally be several miles. As a result, the distance to endpoint is unlikely to be less than the distance to public receptors, unless the process is very remote. In some cases, however, toxic gases in processes in enclosed areas may be eligible for Program 1.

REFRIGERATED TOXIC GASES

If you have a process containing anhydrous ammonia liquefied by refrigeration alone, and your worst-case release would take place into a diked area, the chances are good that the process may be eligible for Program 1, unless there are public receptors very close to the process. Even if you have many times the threshold quantity of ammonia, the process may still be eligible for Program 1.

If you have a process containing ethylene oxide, anhydrous hydrogen fluoride, or methyl chloride liquefied by refrigeration alone, and the release would take place into a diked area, the process may be eligible for Program 1, depending on the size of the diked area, the quantity of the regulated substance, and the location of public receptors.

The worst-case analysis for a process containing chlorine liquefied by refrigeration is unlikely to show eligibility for Program 1, unless your site is extremely remote from the public or the release would occur within an enclosure.

TOXIC LIQUIDS

The distance to an endpoint for a worst-case release involving toxic liquids kept under ambient conditions may be smaller than the distance to public receptors in a number of cases. If public receptors are not found very close to the process (within ½ mile), the process may be eligible for Program 1. However, small-sized facilities are highly unlikely to meet to be eligible for Program 1 if they are in a developed area. Remotely located facilities or processes found near the center of large (acreage) sites are more likely to be eligible.

Substances that are potential candidates to be in processes that are eligible for Program 1 are noted below. Generally, processes that contain toxic liquids at elevated temperatures, including the toxic liquids listed below, would be less likely to be eligible for Program 1 than those at ambient temperature, and processes in diked areas are more likely to be eligible for Program 1 than those in undiked areas.

For processes containing toluene diisocyanate (including toluene 2,4-diisocyanate, toluene 2,6-diisocyanate, and unspecified isomers) or ethylene diamine, the worst-case analysis of a spill of more than a threshold quantity into an undiked area under ambient conditions is likely to demonstrate eligibility for Program 1. If the area of the spill is diked, even processes containing very large quantities of these substances may be eligible for Program 1. In addition, processes containing the following toxic liquids under ambient conditions are likely to be eligible for Program 1 if a spill would take place in a diked area and public receptors are not close to the process:

- Chloroform
- Cyclohexylamine
- Hydrazine
- Isobutyronitrile
- Isopropyl chloroformate
- Propylene oxide

- Titanium tetrachloride
- Vinyl acetate monomer

WATER SOLUTIONS OF TOXIC SUBSTANCES

The list of regulated substances includes several common water solutions of toxic substances. Processes containing such solutions at ambient temperatures may be eligible for Program 1 (depending in some cases on the concentration of the solution), if spills would be contained in diked areas and public receptors are not located close to the process (within ½ mile). As noted above, small-sized facilities in developed areas are highly unlikely to be eligible for Program 1; remotely located facilities or processes found near the center of large (acreage) sites are more likely to be eligible.

Processes containing the following water solutions under ambient conditions may be eligible for Program 1, assuming diked areas that would contain the spill:

- Ammonia in solution
- Formaldehyde (commercial concentrations)
- Hydrofluoric acid (concentration 50 to 70 percent)
- Nitric acid (commercial concentrations)
- Oleum

FLAMMABLE SUBSTANCES

Many processes containing regulated flammable substances are likely to be eligible for Program 1, unless there are public receptors within a very short distance. If you have a process containing up to about 20,000 pounds (twice the threshold quantity) of a regulated flammable substance (other than hydrogen), your process is likely to be eligible for Program 1 if you have no public receptors within about 400 yards (1,200 feet) of the process. If you have up to 100,000 pounds in a process (ten times the threshold quantity), the process may be eligible for Program 1 if there are no public receptors within about 700 yards (2,000 feet). In general, it would be worthwhile to conduct a worst-case analysis for any processes containing only flammables to determine Program 1 eligibility, unless you have public receptors very close to the process. Consequently, you may have to conduct more worst-case analyses if you want to qualify processes for Program 1; for Program 2 and 3 processes, you need analyze only one worst-case release scenario to cover all flammables. For Program 1, you must be able to demonstrate, through your worst-case analysis, that every process you claim is Program 1 meets the criteria.

2.4 PROGRAM 3

Any covered process that is not eligible for Program 1 and meets one of the two criteria specified below is subject to Program 3 requirements, which include risk management measures and requirements virtually identical to the OSHA PSM Standard.

WHAT ARE THE ELIGIBILITY CRITERIA FOR PROGRAM 3?

Your process is subject to Program 3 if:

- Your process does not meet the eligibility requirements for Program 1, and
- Either
  - (a) Your process is subject to OSHA PSM (federal or state); or
  - (b) Your process is in one of nine SIC codes specified in part 68.

WHAT IS THE OSHA PSM STANDARD?

The OSHA Process Safety Management standard (codified at 29 CFR 1910.119) is a set of procedures in thirteen management areas designed to protect worker health and safety in case of accidental releases. Similar to EPA's rule, OSHA PSM applies to a range of facilities that have more than a threshold quantity of a listed substance in a process. All processes subject to this rule and the OSHA PSM standard (federal or state) and not eligible for Program 1 are assigned to Program 3 because the Program 3 prevention program is virtually identical to the elements of the PSM standard. If you are already complying with OSHA PSM for a process, you probably will need to take few, if any, additional steps and develop little, if any, additional documentation to meet the requirements of the Program 3 prevention elements (see Chapter 8 for a discussion of differences between Program 3 prevention and OSHA PSM). EPA placed all covered OSHA PSM processes in Program 3 to eliminate the possibility of imposing overlapping, inconsistent requirements on the same process.

WHAT ARE THE NINE SIC CODES? (§ 68.10)

Program 3 requirements are applicable to a covered process if the process is in one of nine manufacturing SIC codes: 2611, 2812, 2819, 2821, 2865, 2869, 2873, 2879, or 2911. These SIC codes were selected based on an analysis of accidental release data and represent activities for which a relatively high proportion of sources reported releases. The following are the SIC codes and the associated activity:

SIC Code	Industry
2611	Pulp mills
2812	Alkalies and chlorine
2819	Industrial inorganic chemicals (not elsewhere classified)
2821	Plastics materials and resins
2865	Cyclic crudes and intermediates
2869	Industrial organic chemicals (not elsewhere classified)
2873	Nitrogenous fertilizers
2879	Agricultural chemicals (not elsewhere classified)
2911	Petroleum refining

The U.S. government, in cooperation with the Canadian and Mexican governments, has adopted the North American Industry Classification System (NAICS) to replace the SIC codes. EPA has proposed changes to part 68 to replace all references to SIC codes with references to NAICS codes and to update the industry sectors subject to Program 3. Check EPA's webpage (www.epa.gov/ceppo/) for up-to-date information on revisions relating to NAICS codes. Appendix B provides a list of NAICS codes

for industries that may be subject to part 68. This chapter will be updated when the revisions are final.

HOW DO I DEFINE AN SIC CODE FOR A PROCESS?

Unless you have only one process, you probably have not previously needed to assign an SIC code to each of your processes. If your covered process includes several industrial activities, you will need to determine the primary SIC code for assigning Program level based on the primary activity of the process. If the process covers multiple industrial activities, you may list several SIC codes for the process on the registration part of the RMP. Even if a process is considered a support activity for your main production (e.g., your warehouse or wastewater treatment system), you must assign it a separate, appropriate code (e.g., 4952 for waste treatment) to determine if it is subject to Program 3.

This assignment does not affect your ability to consider such support processes as part of the same industrial group for purposes of defining your stationary source; the two decisions are separate.

SIC CODES FOR A PROCESS VS. PRIMARY FACILITY SIC CODE

For purposes of determining program levels, you must identify the applicable SIC codes for each individual process. Unless you have only one process, there may not be a relationship between the covered process SIC code(s) and your facility's primary SIC code. Your primary SIC code may be similar to the SIC codes that you determine for several if not all of your processes, but the primary SIC code should not be used as a default value or to identify an SIC code for a single process. The primary SIC code is assigned based on the activity that contributes the largest percentage of your revenue and is the code you use when you complete Census forms.

2.5 PROGRAM 2

Program 2 is considered a default program level because any covered process that is not eligible for Program 1 or assigned to Program 3 is, by default, subject to Program 2 requirements, including a streamlined accident prevention program. One or more processes at your facility are likely to be in Program 2 if:

- You are a retailer and do not perform any chemical processing activities, such as a propane retailer.
- You use propane (or other flammable) as a fuel for heating.
- You are a publicly owned facility in a state that does not have a delegated OSHA program.
- You use regulated acids in solution in activities that do not fall into one of the nine SIC codes specified for Program 3.
- You store regulated liquid flammable substances in atmospheric storage tanks.

WHAT ARE THE ELIGIBILITY CRITERIA FOR PROGRAM 2?

Your process is subject to Program 2 if:

- Your process does not meet the eligibility requirements for Program 1;
- Your process is not subject to OSHA PSM (federal or state); and
- Your process is not categorized in SIC code 2611, 2812, 2819, 2821, 2865, 2869, 2873, 2879, or 2911.

When determining what program level is appropriate for your covered process, keep in mind that if it does not meet the Program 1 criteria, if it is not covered by OSHA PSM, and it is not classified in the SIC codes listed above, the process automatically is subject to Program 2 requirements.

Exhibit 2-1 provides a summary of the criteria for determining Program level.

EXHIBIT 2-1
PROGRAM LEVEL CRITERIA

Program 1	Program 2	Program 3
No accidents in the previous five years that resulted in any offsite: Death Injury Response or restoration activities at an environmental receptor	The process is not eligible for Program 1 or subject to Program 3.	Process is not eligible for Program 1.
No public receptors in worst-case circle.		Process is subject to OSHA PSM.
Emergency response coordinated with local responders.		Process is classified in SIC code 2611 - Pulp Mills 2812 - Clor-Alkali Manufacturers 2819 - Industrial Inorganics 2821- Plastics and Resins 2865 - Cyclic Crudes and Intermediates 2869 - Industrial Organics 2873 - Nitrogen Fertilizer Manufacturers 2879 - Agricultural Chemicals 2911 - Petroleum Refineries

Note: EPA has proposed to revise part 68 to reflect the shift to the new North American Industry Classification System (NAICS) codes. Check the hotline or the CEPPO web page for up-to-date information on the changes.

2.6 DEALING WITH PROGRAM LEVELS

WHAT IF I HAVE MULTIPLE PROGRAM LEVELS?

If you have more than one covered process, you may be dealing with multiple program levels in your risk management program.

If your facility has processes subject to different program levels, you will need to comply with different program requirements for different processes. Nevertheless, you must submit a single RMP for all covered processes.

If you prefer, you may choose to adopt the most stringent applicable program level requirements for all covered processes. For example, if you have three covered processes, one eligible for Program 1 and two subject to Program 3, you may find it administratively easier to follow the Program 3 requirements for all three covered processes. Remember, though, that this is only an option; we expect that most sources will comply with the set of program level requirements for which each process is eligible.

QS & AS
OSHA

Q. If my state administers the OSHA program under a delegation from the federal OSHA, does that mean that my processes that are subject to OSHA PSM under the state rules are in Program 3?

A. Yes, as long as the process does not qualify for Program 1. Any process subject to PSM, under federal or state rules, is considered to be in Program 3 unless it qualifies for Program 1.

Q. I am a publicly owned facility in a state with a delegated OSHA program. Why are my processes considered to be in Program 3 when the same processes in a state where federal OSHA runs the program are in Program 2?

A. Federal OSHA cannot impose its rules on state or local governments, but when OSHA delegates its program to a state for implementation, the state imposes the rules on itself and local governments. Because these governments are complying with the identical OSHA PSM rules imposed by federal OSHA, they are subject to Program 3. In meeting their obligations under state OSHA rules, they are already substantially in compliance with the Program 3 prevention program requirements. State and local governments in non-state-plan states are not subject to any OSHA rules and must comply with Program 2.

CAN THE PROGRAM LEVEL FOR A PROCESS CHANGE?

A change in a covered process or in the surrounding community can result in a change in the Program level of the process. If this occurs, you must submit an updated RMP within six months of the change that altered the program level for the covered process. If the process no longer qualifies as a covered process (e.g., as a result of a change in the quantity of the regulated substance in the process), then you will need to

"deregister" the process (see Chapter 9 for more information). Typical examples of switching program levels include:

MOVING UP

From Program 1 to Program 2 or 3. You have a covered process subject to Program 1 requirements. A new residential development results in public receptors being located within the distance to the endpoint for a worst-case release for that process. The process is, thus, no longer eligible for Program 1 and must be evaluated to determine whether Program 2 or Program 3 applies. You must submit a revised RMP within six months of the program level change, indicating and documenting that your process is now in compliance with the new program level requirements.

From Not Covered to Program 1, 2 or 3. You have a process that was not originally covered by part 68, but, due to an expansion in production, the process holds an amount of regulated substance that now exceeds the threshold quantity. You must determine which Program level applies and come into compliance with the rule by June 21, 1999, or by the time you exceed the threshold quantity, whichever is later.

From Program 2 to Program 3. You have a process that involves a regulated substance above the threshold that is not in one of the nine SIC codes specified for Program 3 and that had not been subject to OSHA PSM. However, due to one of the following OSHA regulatory changes, the process is now subject to the OSHA PSM standard:

- An OSHA PSM exemption applicable to your process has been eliminated, or
- The regulated substance has been added to OSHA's list of highly hazardous substances.

As a result, the process becomes subject to Program 3 requirements and you must submit a revised RMP to EPA within six months, indicating and documenting that your process is now in compliance with the Program 3 requirements.

SWITCHING DOWN

From Program 2 or 3 to Program 1. At the time you submit your RMP, you have a covered process subject to Program 2/3 requirements because it experienced an accidental release of a regulated substance with offsite impacts four years ago. Subsequent process changes have made such an event unlikely (as demonstrated by the worst-case release analysis). One year after you submit your RMP, the accident will no longer be included in the five-year accident report for the process, so the process is eligible for Program 1. If you elect to qualify the process for Program 1, you must submit a revised RMP within six months of the program level change, indicating and documenting that the process is now in compliance with the new program level requirements.

From Program 2 or 3 to Not Covered. You have a covered process that has been subject to Program 2 or 3 requirements, but due to a reduction in production, the amount of a regulated substance it holds no longer exceeds the threshold. Therefore,

the process is no longer a covered process. You must submit a revised RMP within six months indicating that your process is no longer subject to any program level requirements.

2.7 SUMMARY OF PROGRAM REQUIREMENTS

Regardless of the program levels of your processes, you must complete a five-year accident history for each process (see Chapter 3) and submit an RMP that covers all processes (see Chapter 9). Depending on the Program level of each of your processes, you must comply with the additional requirements described below.

PROGRAM 1

For each Program 1 process, you must conduct and document a worst-case release analysis. You must coordinate your emergency response activities with local responders and sign the Program 1 certification as part of your RMP submission.

PROGRAMS 2 AND 3

For all Program 2 and 3 processes, you must conduct and document at least one worst-case release analysis to cover all toxics and one to cover all flammables. You may need to conduct additional worst-case release analyses if worst-case releases from different parts of your facility would affect different public receptors. You must also conduct one alternative release scenario analysis for each toxic and one for all flammables. See Chapter 4 or the *RMP Offsite Consequence Analysis Guidance* for specific requirements. You must coordinate your emergency response activities with local responders and, if you use your own employees to respond to releases, you must develop and implement an emergency response program. See Chapter 8 for more details.

For each Program 2 process, you must implement all of the elements of the Program 2 prevention program: safety information, hazard review, operating procedures, training, maintenance, compliance audits, and incident investigations. See Chapter 6 for more details.

For each Program 3 process, you must implement all of the elements of the Program 3 prevention program: process safety information, process hazard analysis, standard operating procedures, training, mechanical integrity, compliance audits, incident investigations, management of change, pre-startup reviews, contractors, employee participation, and hot work permits. See Chapter 7 for more details.

Exhibit 2-2 provides a summary of the requirements for each Program level.

EXHIBIT 2-2 COMPARISON OF PROGRAM REQUIREMENTS		
Program 1	**Program 2**	**Program 3**
Worst-case release analysis	Worst-case release analysis	Worst-case release analysis
	Alternative release analysis	Alternative release analysis
5-year accident history	5-year accident history	5-year accident history
	Document management system	Document management system
Prevention Program		
Certify no additional prevention steps needed	Safety Information	Process Safety Information
	Hazard Review	Process Hazard Analysis.
	Operating Procedures	Operating Procedures
	Training	Training
	Maintenance	Mechanical Integrity
	Incident Investigation	Incident Investigation
	Compliance Audit	Compliance Audit
		Management of Change
		Pre-Startup Review
		Contractors
		Employee Participation
		Hot Work Permits
Emergency Response Program		
Coordinate with local responders	Develop plan and program and coordinate with local responders	Develop plan and program and coordinate with local responders
Submit One Risk Management Plan for All Covered Processes		

2.8 EXAMPLE SOURCES

The six sources described in this section will be used in this document to highlight important stages in developing a risk management program.

Source A

A ceramics manufacturer uses no regulated substances above the thresholds in its manufacturing processes. The facility, however, has an interruptible gas contract with its local utility and has a propane storage tank on site as a backup source of power. The maximum quantity in the tank exceeds the applicable threshold quantity of 10,000 pounds; the tank, therefore, is a covered process.

The tank is located 300 yards inside the fence line and the nearest public receptor (another industrial facility) is 100 yards from the fence line. The distance to the overpressure endpoint for a worst-case release from the tank is approximately 0.2 miles or 352 yards. There is no public receptor within the distance to an endpoint from a worst-case release, and the process had no accidental releases of propane with resulting in offsite impacts in the last five years. The process is eligible for Program 1.

Source B

A propane retailer located in a commercial area has a single 18,000-gallon propane tank. The retailer repackages propane into cylinders for industrial and residential customers and refills small propane tanks for grills. The propane tank holds more than a threshold quantity and is thus a covered process.

The facility is bordered by several small businesses. An evaluation of the worst-case release indicates that the small businesses will be potentially impacted by a worst-case release from the propane tank. The process is not subject to the OSHA PSM Standard, nor is it categorized in one of the nine SIC codes specified for Program 3 coverage. The process is subject to Program 2.

Source C

An agricultural retailer has a 200-ton tank of ammonia and an 18,000-gallon propane tank. The retailer unloads both ammonia and propane from these bulk tanks into smaller tanks that are then transported to farms. The facility is not fenced. The facility is within 0.15 mile of residences and the business center of the small town.

The facility has two covered processes: the 200-ton tank of ammonia (Process A) and the 18,000-gallon propane tank (Process B). A worst-case release analysis finds that the worst-case releases from both processes will potentially impact the residences and the business center of town. Neither processes are subject to OSHA PSM, nor are they categorized in one of the nine listed SIC codes for program 3. As a result, both processes are subject to Program 2.

Source D

A metal products manufacturer stores hydrochloric acid (37 percent solution) and uses it in its plating process, which is connected to a storage tank that holds 50,000 pounds of the solution. Hydrochloric acid is delivered in tank trucks and unloaded into the storage tank. The manufacturer also operates a wastewater treatment plant that uses chlorine, supplied from five, interconnected one-ton tanks, which are stored in a rack. The facility is in an industrial area and borders directly on another industrial facility, whose workers park in the area close to the fence line. In addition, a river borders one side of the facility.

The facility has two covered processes: the 50,000-pound tank of hydrochloric acid at 37 percent (Process A) and the process involving five interconnected one-ton tanks of chlorine in the wastewater treatment plant (Process B). A worst-case release analysis finds that the worst-case releases from both processes will potentially impact the bordering industrial facility and its workers. Process B is subject to the OSHA PSM standard, but Process A is not. Process A is also not categorized in one of the nine listed SIC codes for Program 3. Therefore, Process B is subject to Program 3 and Process A is subject to Program 2.

Source E

An inorganic chemical manufacturer uses hydrofluoric acid in solution to manufacture fluoroboric acid at a site that is approximately 500 yards square. It also has a water treatment plant using chlorine. The manufacturer stores 10 tons of 70 percent HF solution, which is piped to the reactor vessels. The wastewater treatment plant stores an average of ten one-ton tanks of chlorine on a rack. The plant is in an industrial area. The HF storage tank is 150 yards from the property boundary. The nearest neighboring building or workers are 300 yards away.

The facility has two covered processes: the process involving the 10-ton tank of hydrofluoric acid at 70 percent (Process A) and process involving the ten one-ton tanks of chlorine in the wastewater treatment plant (Process B). A worst-case release analysis finds that the worst-case releases from both processes will potentially impact the neighboring buildings and workers. Process B is subject to the OSHA PSM standard, but Process A is not. Process A activities are categorized in SIC code 2819. Therefore, both processes are subject to Program 3.

Source F

A large chemical manufacturer operates a site that is approximately a half mile wide and two miles long, with a major river on one long side and a four-lane road on the other. There are industrial facilities on the other side of the road and river (a half-mile wide); neighboring facilities' fence lines abut the company's property boundary. The company maintains a 300-yard buffer zone on each narrow end of the facility and 50-yard buffer between its processes and the road and river. The company manufactures a variety of chemicals, including chloroform, chorine, epichlorohydrin, ethylene, HCl, hydrogen cyanide, TDI, methyl chloride, phosgene, and propylene, all of which are present above threshold quantities in process vessels and storage tanks. The TDI process and storage tanks are located at the center of the facility. The ethylene and propylene tanks are located 500 yards from the river bank. A propane tank, used as a backup fuel source, is located just inside the buffer zone, 50 yards from the highway and 100-yards from the entrance of a facility across the highway.

Although the facility has a number of separate production and storage units, several of the units with regulated toxic substances are considered to be co-located and, therefore, are one process. The propylene and ethelyne tanks are far enough apart to be considered separate processes. A worst-case release analysis determines that both of these tanks have no public receptors within the distances to their endpoint. The TDI process is not co-located or interconnected to any other covered process. A worst-case release analysis determines that the TDI process's worst-case release would reach its endpoint within the fenceline. None of these three processes has experienced a release of a regulated substance during the past five years that resulted in any offsite consequences. Each of these is, therefore, eligible for Program 1. The propane tank also is not co-located with any other covered vessel. Because it is used as a backup fuel for buildings on site, but not for any covered processes, it is not subject to OSHA PSM. Because its worst-case release would impact public receptors, it is subject to Program 2. The other processes are subject to Program 3 because at least one of the production or storage units in each process is subject to OSHA PSM.

CHAPTER 3: FIVE-YEAR ACCIDENT HISTORY

The five-year accident history involves an examination of the effects of any accidental releases of one or more of the regulated substances from a covered process in the five years prior to the submission of a Risk Management Plan (RMP). A five-year accident history must be completed for each covered process, including the processes in Program 1, and all accidental releases meeting specified criteria must be reported in the RMP for the process.

Note that a Program 1 process may have had an accidental release that must be included in the five-year accident history, even though the release does not disqualify the process from Program 1. The accident history criteria that make a process ineligible for Program 1 (certain offsite impacts) do not include other types of effects that require inclusion of a release in the five-year accident history (on-site impacts and more inclusive offsite impacts). For example, an accidental release may have led to worker injuries, but no other effects. This release would not bar the process from Program 1 (because the injuries were not offsite), but would need to be reported in the five-year accident history. Similarly, a release may have resulted in damage to foliage offsite (environmental damage), triggering reporting, but because the foliage was not part of an environmental receptor (e.g., national park or forest) it would not make the process ineligible for Program 1.

3.1 WHAT ACCIDENTS MUST BE REPORTED?

The five-year accident history covers only certain releases:

- The release must be from a covered process and involve a regulated substance held above its threshold quantity in the process.
- The release must have caused at least one of the following:
  - On-site deaths, injuries, or significant property damage (§68.42(a)); or
  - Known offsite deaths, injuries, property damage, environmental damage, evacuations, or sheltering in place (§68.42(a)).

If you have had a release of a regulated substance from a process where the regulated substance is held below its threshold quantity, you do not need to report that release even if the release caused one of the listed impacts or if the process is covered for some other substance. You may choose to report the release in the five-year accident history, but you are not required to do so.

3.2 WHAT DATA MUST BE PROVIDED?

The following information should be included in your accident history for every reported release:

Date. Indicate the date on which the accidental release began.

Time. Indicate the time the release began.

Release duration. Indicate the approximate length of time of the release in minutes.

Chemical(s). Indicate the regulated substance(s) released. Use the name of the substance as listed in § 68.130 rather than a synonym (e.g., propane rather than LPG). If the release was of a flammable mixture, list the primary regulated substances in the mixture if feasible; if the contents of the mixture are uncertain, list it as a flammable mixture. If non-regulated substances were also released and contributed to the impacts, you may want to list them as well, but you are not required to do so.

Quantity released. Estimate the amount of each substance released in pounds. The amount should be estimated to two significant digits, or as close to that as possible. For example, if you estimate that the release was between 850 and 900 pounds, provide a best guess. We realize that you may not know precise quantities. For flammable mixtures, you may report the quantity of the mixture, rather than that of the individual regulated substances.

Release event. Indicate which of the following release events best describes your accident. Check all that apply:

- *Gas Release.* A gas release is a release of the substance as a gas (rather than vaporized from a liquid). If you hold a gas liquefied under refrigeration, report the release as a liquid spill.

- *Liquid Spill/ Evaporation.* A liquid spill/evaporation is a release of the substance in a liquid state with subsequent vaporization.

- *Fire.* A fire is combustion producing light, flames, and heat.

- *Explosion.* An explosion is a rapid chemical reaction with the production of noise, heat, and violent expansion of gases.

Release source. Indicate all that apply.

- *Storage Vessel.* A storage vessel is a container for storing or holding gas or liquid. Storage vessels include transportation containers being used for on-site storage.

- *Piping.* Piping refers to a system of tubular structures or pipes used to carry a fluid or gas.

- *Process Vessel.* A process vessel is a container in which substances under certain conditions (e.g., temperature, pressure) participate in a process (e.g., substances are manufactured, blended to form a mixture, reacted to convert them into some other final product or form, or heated to purify).

- *Transfer Hose.* A transfer hose is a tubular structure used to connect, often temporarily, two or more vessels.

- *Valve*. A valve is a device used to regulate the flow in piping systems or machinery. Relief valves and rupture disks open to release pressure in vessels.

- *Pump*. A pump is a device that raises, transfers, or compresses fluids or that attenuates gases by suction or pressure or both.

- *Joint*. The surface at which two or more mechanical components are united.

- *Other*. Specify other source of the release.

Weather conditions at time of event (if known). This information is important to those concerned with modeling the effects of accidents. Reliable information from those involved in the incident or from an on-site weather station is ideal. However, this rule does not require your facility to have a weather station. If you do not have an onsite weather station, use information from your local weather station, airport, or other source of meteorological data. To the extent possible, complete the following:

- *Wind Speed and Direction*. Wind speed is an estimate of how fast the wind is traveling. Indicate the speed in miles per hour. Wind direction is the direction from which the wind comes. For example, a wind that blows from east to west would be described as having an eastern wind direction. You may describe wind direction as a standard compass reading such as "Northeast" or "South-southwest."

  You may also describe wind direction in degrees--with North as zero degrees and East as 90 degrees. Thus, northeast would represent 45 degrees and south-southwest would represent 202.5 degrees. Abbreviations for the wind direction such as NE (for northeast) and SSW (for south-southwest) are also acceptable.

- *Temperature*. The ambient temperature at the scene of the accident in degrees Fahrenheit. If you did not keep a record, you can use the high (for daytime releases) or low (for nighttime releases) for the day of the release. Local papers publish these data.

- *Stability Class*. Depending on the amount of incoming solar radiation as well as other factors, the atmosphere may be more or less turbulent at any given time. Meteorologists have defined six atmospheric stability classes, each representing a different degree of turbulence in the atmosphere. When moderate to strong incoming solar radiation heats air near the ground, causing it to rise and generating large eddies, the atmosphere is considered unstable, or relatively turbulent. Unstable conditions are associated with stability classes A and B. When solar radiation is relatively weak, air near the surface has less of a tendency to rise and less turbulence develops. In this case, the atmosphere is considered stable or less turbulent with weak winds. The stability class is E or F. Stability classes D and C represent conditions of neutral stability or moderate turbulence respectively. Neutral conditions are associated with relatively strong wind speeds and moderate solar radiation.

Exhibit 3-1 presents the stability classes associated with wind speeds, time of day, and cloud cover.

- *Precipitation Present*. Precipitation may take the form of hail, mist, rain, sleet, or snow. Indicate "yes" or "no" based on whether there was any precipitation at the time of the accident.

- *Unknown*. If you have no record for some or all of the weather data, indicate "unknown" for any missing item. We realize that you may not have weather data for accidents that occurred in the past. You should, however, collect these data for any future accidents.

EXHIBIT 3-1
ATMOSPHERIC STABILITY CLASSES

SURFACE WIND SPEED AT 10 METERS		DAY			NIGHT	
		Incoming Solar Radiation			Thinly Overcast or ≥ 4/8 low cloud	≤ 3/8 Cloud
Meters per second	Miles per hour	Strong*	Moderate	Slight**		
< 2	<4.5	A	A-B	B		
2-3	4.5-7	A-B	B	C	E	F
3-5	7-11	B	B-C	C	D	E
5-6	11-13	C	C-D	D	D	D
>6	>13	C	D	D	D	D

* Sun high in the sky with no clouds.
** Sun low in the sky with no clouds.

On-site impacts. Complete the following about on-site effects.

- *Deaths.* Indicate the number of on-site deaths that are attributed to the accident or mitigation activities. On-site deaths means the number of employees, contract employees, offsite responders, or others (e.g., visitors) who were killed by direct exposure to toxic concentrations, radiant heat, or overpressures from accidental releases or from indirect consequences of a vapor cloud explosion from an accidental release (e.g., flying glass, debris, other projectiles). You should list employee/contractor, offsite responder, and other on-site deaths separately.

- *Injuries.* An injury is any effect that results either from direct exposure to toxic concentrations, radiant heat, or overpressures from accidental releases or from indirect consequences of a vapor cloud explosion (e.g., flying glass, debris, other projectiles) from an accidental release and that requires medical

treatment or hospitalization. You should list injuries to employees and contractors, offsite responders, and others separately.

Medical treatment means treatment, other than first aid, administered by a physician or registered professional personnel under standing orders from a physician.

Your OSHA occupational injury and illness log (200 Log) will help complete these items for employees.

- *Property Damage*. Estimate the value of the equipment or business structures (for your business alone) that were damaged by the accident or mitigation activities. Record the value in American dollars. Insurance claims may provide this information. Do **not** include any losses that you may have incurred as a result of business interruption.

Q & A
PROPERTY DAMAGE

Q. What level of offsite property damage triggers reporting?

A. Any level of known offsite property damage triggers inclusion of the accident in the five-year accident history. You are not required to conduct a survey to determine if such damage occurred, but if you know, or could reasonably be expected to know (e.g., because of reporting in the newspapers), that damage occurred, you must include the accident.

Known offsite impacts. These are impacts that you know or could reasonably be expected to know of (e.g., from media reports or from reports to your facility) that occurred as a result of the accidental release. You are not required to conduct an additional investigation to determine offsite impacts.

- *Deaths.* Indicate the number of offsite deaths that are attributable to the accident or mitigation activities. Offsite deaths means the number of community members who were killed by direct exposure to toxic concentrations, radiant heat, or overpressures from accidental releases or from indirect consequences of a vapor cloud explosion from an accidental release (e.g., flying glass, debris, other projectiles).

- *Injuries.* Indicate the number of injuries among community members. Injury means any effect that results either from direct exposure to toxic concentrations, radiant heat, or overpressures from accidental releases or from indirect consequences of a vapor cloud explosion from an accidental release (e.g., flying glass, debris, other projectiles) and that requires medical treatment or hospitalization.

- *Evacuated.* Estimate the number of members of the community who were evacuated to prevent exposure that might have resulted from the accident. A total count of the number of people evacuated is preferable to the number of

houses evacuated. People who were ordered to move simply to improve access to the site for emergency vehicles are not considered to have been evacuated.

- *Sheltered.* Estimate the number of members of the community who were sheltered-in-place during the accident. Sheltering-in-place occurs when community members are ordered to remain inside their residence or place of work until the emergency is over to prevent exposure to the effects of the accidental release. Usually these orders are communicated by an emergency broadcast or similar method of mass notification by response agencies.

- *Environmental Damage.* Indicate whether any environmental damage occurred and specify the type. The damage to be reported is not limited to environmental receptors listed in the rule. Any damage to the environment (e.g., dead or injured animals, defoliation, water contamination) should be identified. You are **not**, however, required to conduct surveys to determine whether such impact occurred. Types of environmental damage include:

  - Fish or animal kills.
  - Lawn, shrub, or crop damage minor defoliation.
  - Lawn, shrub, or crop damage major defoliation.
  - Water contamination.
  - Other (specify).

Initiating event. Indicate the initiating event that was the immediate cause of the accident, if known. If you conducted an investigation of the release, you should have identified the initiating event.

- *Equipment Failure.* A device or piece of equipment failed or did not function as designed. For example, the vessel wall corroded or cracked.

- *Human Error.* An operator performed a task improperly, either by failing to take the necessary steps or by taking the wrong steps.

- *Weather Conditions.* Weather conditions, such as lightning, hail, ice storms, tornados, hurricanes, floods, or high winds, caused the accident.

- *Unknown.*

Contributing factors. These are factors that contributed to the accident, but were not the initiating event. If you conducted an investigation of the release, you may have identified factors that led to the initiating event or contributed to the severity of the release. Indicate all that apply.

- *Equipment Failure.* A device or piece of equipment failed to function as designed, thereby allowing a substance leading to or worsening the accidental release.

- *Human error.* An operator performed an operation improperly or made a mistake lead to or worsened the accident.

- *Improper Procedures.* The procedure did not reflect the proper method of operation, the procedure omitted steps that affected the accident, or the procedure was written in a manner that allowed for misinterpretation of the instructions.

- *Overpressurization.* The process was operated at pressures exceeding the design working pressure.

- *Upset Condition.* Incorrect process conditions (e.g., increased temperature or pressure) contributed to the release.

- *By-pass Condition.* A failure occurred in a pipe, channel, or valve that diverts fluid flow from the main pathway when design process or storage conditions are exceeded (e.g., overpressure). By-pass conditions may be designed to release the substance to restore acceptable process or storage conditions and prevent more severe consequences (e.g., explosion).

- *Maintenance Activity/ Inactivity.* A failure occurred because of maintenance activity or inactivity. For example, the storage racks remained unpainted for so long that corrosion caused the metal to fail.

- *Process Design.* A failure resulted from an inherent flaw in the design of the process (e.g., pressure needed to make product exceeds the design pressure of the vessel).

- *Unsuitable Equipment.* The equipment used was incorrect for the process. For example, the forklift was too large for the corridors.

- *Unusual Weather Conditions.* Weather conditions, such as lightning, hail, ice storms, tornados, hurricanes, floods, or high winds contributed to the accident.

- *Management Error.* A failure occurred because management did not exercise its managerial control to prevent the accident from occurring. This is usually used to describe faulty procedures, inadequate training, inadequate oversight, or failure to follow existing administrative procedures.

Whether offsite responders were notified. If known, indicate whether response agencies (e.g., police, fire, medical services) were contacted.

Changes introduced as a result of the accident. Indicate any measures that you have taken at the facility to prevent recurrence of the accident. Indicate all that apply.

- *Improved/ Upgraded Equipment.* A device or piece of equipment that did not function as designed was repaired or replaced.

- *Revised Maintenance.* Maintenance procedures were clarified or changed to ensure appropriate and timely maintenance including inspection and testing (e.g., increasing the frequency of inspection or adding a testing method).

- *Revised Training.* Training programs were clarified or changed to ensure that employees and contract employees are aware of and are practicing correct safety and administrative procedures.

- *Revised Operating Procedures.* Operating procedures were clarified or changed to ensure that employees and contract employees are trained on appropriate operating procedures.

- *New Process Controls.* New process designs and controls were installed to correct problems and prevent recurrence of an accidental release.

- *New Mitigation Systems.* New mitigation systems were initiated to limit the severity of accidental releases.

- *Revised Emergency Response Plan.* The emergency response plan was revised.

- *Changed Process.* Process was altered to reduce the risk (e.g., process chemistry was changed).

- *Reduced Inventory.* Inventory was reduced at the facility to reduce the potential release quantities and the magnitude of the hazard.

- *Other.*

- *None.* No changes initiated at facility as a result of the accident (e.g., because none were necessary or technically feasible). There may be some accidents that could not have been prevented because they were caused by events that are too rare to merit additional steps. For example, if a tornado hit your facility and you are located in an area where tornados are very rare, it may not be reasonable to design a "tornado proof" process even if it is technically feasible.

3.3 OTHER ACCIDENT REPORTING REQUIREMENTS

You should already have much of the data required for the five-year accident history because of the reporting requirements under the Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA), EPCRA, and OSHA (e.g., log of occupational injuries and illnesses). This information should minimize the effort necessary to complete the accident history.

At the same time, some of the information originally reported to response agencies may have been inaccurate because it was reported during the release when a full

assessment was not possible. It is imperative that you include the most accurate, up-to-date information possible in the five-year accident history. This information may not always match the original estimates from the initial reporting of the accident's effects.

CERCLA Section 103(a) requires you to immediately notify the National Response Center if your facility releases a hazardous substance to the environment in greater than a reportable quantity (see 40 CFR part 302). Toxic substances regulated under part 68 are also CERCLA hazardous substances, but most of the flammable substances regulated under part 68 are not subject to CERCLA reporting. Notice required under CERCLA includes the following information:

- The chemical name or identity of any substance involved in the release
- An indication of whether the substance is on the list referred to in Section 302(a)
- An estimate of the quantity of substance that was released into the environment
- The time and duration of the release
- The medium or media into which the release occurred.

EPCRA Section 304 requires facilities to report to the community emergency coordinator of the appropriate local emergency planning committee (LEPC) and state emergency response commission (SERC) releases of extremely hazardous substances to the environment in excess of reportable quantities (as set forth in 40 CFR part 302). All toxic substances regulated under part 68 are subject to EPCRA reporting; flammables regulated under part 68 are generally not subject to EPCRA reporting. The report required by EPCRA is to include:

- Chemical name or identity of all substances involved in the accident
- An estimate of the quantity of substances released to the environment
- The time and duration of the release.

The owner or operator is also required to release a Follow-up Emergency Notice as soon as possible after a release which requires notification. This notice should update the previously released information and include additional information regarding actions taken to respond to the release, any known or anticipated acute or chronic health risks associated with the release, and where appropriate, advice regarding medical attention necessary for exposed individuals.

OSHA's log of occupational injuries and illnesses, OSHA No. 200, is used for recording and classifying recordable occupational injuries and illnesses, and for noting the extent and outcome of each case. The log shows when the occupational injury or illness occurred, to whom, what the injured or ill person's regular job was at the time of the injury or illness exposure, the department in which the person was employed,

the kind of injury or illness, how much time was lost, and whether the case resulted in a fatality, etc. The following are the sections of the illness/ injury log that are useful in completing the accident history.

Descriptive section of the log:

- **Column B:** date of work accident which resulted in injury
- **Column C:** name of injured person
- **Column F:** description of nature of injury or illness

Injury portion of the log:

- **Column 1:** date of death is entered if an occupational injury results in a fatality
- **Column 6:** an injury occurred, but did not result in lost workdays

Illness portion of the log:

- **Column 7:** for occupational illnesses, an entry is placed in one of the columns 7a-7g, depending upon which column is applicable.

PART 68 INCIDENT INVESTIGATION

An incident investigation is a requirement of the rule (§68.60 and 68.81). For accidents involving processes categorized in Program 2 or Program 3, you must investigate each incident which resulted in, or could reasonably have resulted in, a catastrophic release of a regulated substance. A report, which includes the following information, should be prepared at the conclusion of the investigation:

- Date of incident
- Date investigation began
- Description of the incident
- Factors that contributed to the incident
- Any recommendations resulting from the investigation.

Because the incident investigation report must be retained for five years, you will have a record for completing the five-year accident history for updates of the RMP.

QS & AS
ACCIDENT HISTORY

Q. When does the five-year period to be reported in the accident history begin?

A. The five-year accident history must include all accidental releases from covered processes meeting the specified criteria that occurred in five years preceding the date the RMP for the processes was submitted. For example, if an RMP is submitted on June 1, 1999, the five-year accident history must cover the period between June 1, 1994 and June 1, 1999.

Q. If a facility has recently changed ownership, is the new facility owner required to include accidents which occurred prior to the transfer of ownership in the accident history portion of the RMP submitted for the facility?

A. Yes, accidents involving covered processes that occurred prior to the transfer of ownership should be included in the five-year accident history. You may want to explain that the ownership has changed in your Executive Summary.

Q. If I have a large on-site incident, but no offsite impact, would I have to report it in the five-year accident history?

A. It would depend on whether you have onsite deaths, injuries, or significant property damage. You could have a large accident without any of these consequences (e.g., a large spill that was contained); this type of release would not have to be included in the five-year accident history.

Q. I had a release where several people were treated at the hospital and released; they attributed their symptoms to exposure. We do not believe that their symptoms were in fact the result of exposure to the released substance. Do we have to report these as offsite impacts?

A. Yes, you should report them in your five-year accident history. You may want to use the executive summary to state that you do not believe that the impacts can be legitimately attributed to the release and explain why.

CHAPTER 4: OFFSITE CONSEQUENCE ANALYSIS

RMP OFFSITE CONSEQUENCE ANALYSIS GUIDANCE

This chapter is intended for people who plan to do their own air dispersion modeling. EPA has prepared a separate document, *RMP Offsite Consequence Analysis Guidance*, which provides simple methods and reference tables for determining distance to an endpoint for worst-case and alternative release scenarios. In conjunction with the National Oceanographic and Atmospheric Administration (NOAA), EPA has developed a software program, RMP*Comp™, that performs calculations described in the *RMP Offsite Consequence Analysis Guidance*. This software is available for free from the NOAA Internet website at http://www.noaa.gov. In addition, EPA is preparing industry-guidance for several industries covered by part 68. In these documents, EPA provides chemical-specific modeling for the covered industries. **All the information provided in this chapter is also included in EPA's *RMP Offsite Consequence Analysis Guidance* and the industry-specific guidance documents available from EPA.** If you intend to use those guidances to carry out your offsite consequence analysis, you may skip this chapter. If you plan to do your own modeling, this chapter will provide you with the information you need to comply with the rule requirements; it does not provide methodologies.

4.1 INTRODUCTION

The offsite consequence analysis consists of two elements:

- A **worst-case release scenario** analysis applicable to all covered processes, regardless of program level, as follows:
  - To determine whether a process is eligible for Program 1, you must evaluate the worst-case scenarios for each toxic and flammable substance held above the threshold in the process. The process is eligible for Program 1 if there are no public receptors within the distance to an endpoint for all of the worst-case scenarios analyzed for the process (and the other Program 1 criteria are met — see Chapter 2). For every Program 1 process, you must report on the worst-case scenario with the greatest distance to an endpoint.
  - If your site has Program 2 or Program 3 processes (processes that are not eligible for Program 1 — see Chapter 2), you must analyze and report on one worst-case analysis representing all toxic regulated substances present above the threshold quantity and one worst-case analysis representing all flammable regulated substances present above the threshold quantity.
  - You may need to submit an additional worst-case analysis if a worst-case release from elsewhere at the source would potentially affect public receptors different from those affected by the initial worst-case scenario(s).

- An **alternative release scenario** analysis, applicable to all Program 2 and Program 3 processes, as follows:
  - Alternative release scenarios should be those that may result in concentrations, overpressures, or radiant heat levels that reach the endpoints specified for these effects beyond the fenceline of your facility.
  - You must present information on one alternative release scenario analysis for each regulated toxic substance held above the threshold quantity, including the substance considered in the worst-case analysis.
  - You must present information on one alternative release scenario analysis to represent all flammable substances held above the threshold quantity.

If the distance to the endpoint for your worst-case release just reaches your fenceline, you may not have an alternative release scenario with a distance to an endpoint that goes beyond the fenceline. However, you still must report an alternative release scenario. You may want to explain in the RMP Executive Summary why the distance does not extend beyond the fenceline.

HOW SHOULD I CONDUCT THE ANALYSIS?

You may use EPA's *RMP Offsite Consequence Analysis Guidance* to carry out your consequence analysis. Results obtained using the methods in EPA's Guidance are expected to be conservative. Conservative assumptions have been introduced to compensate for high levels of uncertainty. EPA's guidance is optional, and you are free to use other air dispersion models, fire or explosion models, or computation methods provided that:

- They are publicly or commercially available or are proprietary models that you are willing to share with the implementing agency;
- They are recognized by industry as applicable to current practices;
- They are appropriate for the chemicals and conditions being modeled;
- You use the applicable definitions of worst-case scenarios; and
- You use the applicable parameters specified in the rule.

EXHIBIT 4-1
CONSIDERATIONS FOR CHOOSING A MODELING METHOD

Approach	Examples	Advantages	Disadvantages
Simple guidance	EPA's *Offsite Consequence Analysis Guidance*	✦ Free ✦ No computer requirements ✦ Simple to use ✦ Provides all data needed ✦ Provides tables of distances ✦ Ensures compliance with rule	✦ Conservative results ✦ Few site-specific factors considered ✦ Little flexibility in scenario development
Simple computer models	EPA models, such as RMP*Comp™	✦ No/low cost ✦ May be simple to use ✦ Can consider some site-specific factors	✦ Some may not be simple to use ✦ Likely to give conservative results ✦ May not accept all of EPA's required assumptions ✦ May not include chemical-specific data ✦ May not address all consequences
Complex computer models	Commercially available models	✦ May address a variety of scenarios ✦ May consider many site-specific factors	✦ May be costly ✦ May require high level of expertise
Calculation methods	"Yellow Book" (Netherlands TNO)	✦ Low cost ✦ No computer requirements	✦ May require expertise to apply methods ✦ May require development of a variety of data

Complex models that can account for many site-specific factors may give less conservative estimates of offsite consequences than the simplified methods in EPA's guidance, particularly for alternative scenarios, for which EPA has not specified many assumptions. However, complex models may be expensive and require considerable expertise to use; EPA's optional guidance is designed to be simple and straightforward. You will need to consider the tradeoff in deciding how to carry out your required consequence analyses. Exhibit 4-1 provides additional suggestions on making this decision.

Whether you use EPA's guidance or another modeling method, you should bear in mind that the results you obtain from modeling your worst-case or alternative scenarios should not be considered to predict the likely results of an accidental release. The worst-case assumptions are very conservative, and, regardless of the model used,

you can expect very conservative results. Results from modeling alternative scenarios will be less conservative; however, you still must use conservative endpoints.

In addition, results of an actual release will depend on many site-specific conditions (e.g., wind speed and other weather conditions) and factors related to the release (e.g., when and how the release occurs, how long it takes to stop it). You should make reasonable assumptions regarding such factors in developing your alternative scenarios, but the circumstances surrounding an actual release may be different. Different models likely will provide different results, even with the same assumptions, and most models have not been verified with experimental data; therefore, results of even sophisticated modeling have a high degree of uncertainty and should be viewed as providing a basis for discussion, rather than predictions. Modeling results should be considered particularly uncertain over long distances (i.e., 10 kilometers or more).

Exhibit 4-2 provides suggestions for assistance on modeling.

4.2 WORST-CASE RELEASE SCENARIOS

EPA has defined a worst-case release as the release of the largest quantity of a regulated substance that results in the greatest distance from the point of release to a specified endpoint (§68.3). You must estimate the distance as follows:

- Part 68, Appendix A lists the toxic endpoint you must use for each regulated toxic substance. For the worst-case analysis for toxic substances, you are required to estimate the air dispersion distance to the endpoint, using certain conservative assumptions concerning quantity released and release conditions.

- A vapor cloud explosion is specified as the worst-case scenario for flammable substances. For the worst-case analysis for flammable substances, you need to estimate the distance to an overpressure endpoint of 1 pound per square inch (psi) resulting from a vapor cloud explosion of a cloud containing the largest quantity of the regulated flammable substance from a vessel or process pipe line failure.

This section describes the assumptions you must make and what you need to do to meet the requirements for worst-case scenario analysis under the rule. Exhibit 4-3 summarizes the required parameters for the worst-case analysis.

WORST-CASE RELEASES OF TOXIC SUBSTANCES

For the worst-case release analysis for toxic substances, you need to use the assumptions discussed below, the properties of the substance, and an appropriate air dispersion model or EPA's optional guidance to estimate the distance from the release point to the point at which the concentration of the substance in air is equal to the toxic endpoint specified in the rule. Because the assumptions required for the worst-case analysis are very conservative, the results likely will be very conservative. The endpoints specified for the regulated toxic substances are intended to be protective of the general public. These endpoints are concentrations below which it is believed nearly all individuals could be exposed for one-half to one hour without any serious health effects. In addition, the worst-case analysis is carried out using very

EXHIBIT 4-2
POSSIBLE SOURCES OF ASSISTANCE ON MODELING

- You may be able to obtain modeling help from the implementing agency in your area; for example, implementing agencies in California are preparing to provide assistance to regulated sources.
- If you use certain models, users' groups may be a source of assistance; for example, there is an ALOHA model users' group.
- If you use a commercial model, you probably can request assistance from the model developer or distributor.
- Publications of the Center for Process Safety of the American Institute of Chemical Engineers (AIChE) may provide useful information on modeling; examples of such publications include:
  - *Guidelines for Evaluating the Characteristics of Vapor Cloud Explosions, Flash Fires, and BLEVEs* (1994), and
  - *Guidelines for Use of Vapor Cloud Dispersion Models* (1987).
- EPA publications also may provide useful modeling information; examples include:
  - *Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants*, EPA-450/4-88-009 (September 1988), and
  - *Guidance on the Application of Refined Dispersion Models for Hazardous/Toxic Air Release*, EPA-454/R-93-002 (May 1993).
  - EPA guidance is available at http://www.epa.gov/scram001//

conservative assumptions about weather and release conditions. The distance to the endpoint estimated under worst-case conditions should not be considered a zone in which the public would likely be in danger; instead, it is intended to provide an estimate of the maximum possible area that might be affected in the unlikely event of catastrophic conditions. Distances greater than about 10 kilometers are particularly uncertain. EPA intends the estimated distances to provide a basis for a discussion among the regulated community, emergency responders, and the public, rather than a basis for any specific actions.

MODELING ASSUMPTIONS

Quantity. EPA has defined (§68.3) a worst-case release as the release of the largest quantity of a regulated substance from a vessel or process line failure that results in the greatest distance to a specified endpoint. For substances in vessels, you must assume release of the largest amount in a single vessel; for substances in pipes, you must assume release of the largest amount in a pipe.

EXHIBIT 4-3
REQUIRED PARAMETERS FOR MODELING WORST-CASE SCENARIOS

Endpoints
- ✦ For toxic substances, use the endpoint specified in part 68, Appendix A.
- ✦ For flammable substances, use the endpoint of an overpressure of 1 pound per square inch (psi) for vapor cloud explosions.

Wind speed/stability
- ✦ Use wind speed of 1.5 meters per second and F stability class unless you can demonstrate that local meteorological data applicable to the site show a higher minimum wind speed or less stable atmosphere at all times during the previous three years. If you can demonstrate a higher minimum wind speed or less stable atmosphere over three years, these minimums may be used.

Ambient temperature/humidity
- ✦ For toxic substances, use the highest daily maximum temperature during the past three years and average humidity for the site.

Height of release
- ✦ For toxic substances, assume a ground level release.

Topography
- ✦ Use urban or rural topography, as appropriate.

Dense or neutrally buoyant gases
- ✦ Tables or models used for dispersion of regulated toxic substances must appropriately account for gas density.

Temperature of released substance
- ✦ For liquids (other than gases liquefied by refrigeration), use the highest daily maximum temperature, based on data for the previous three years, or at process temperature, whichever is higher.
- ✦ Assume gases liquefied by refrigeration at atmospheric pressure are released at their boiling points.

The largest quantity should be determined taking into account administrative controls. Administrative controls are written procedures that limit the quantity of a substance that can be stored or processed in a vessel or pipe at any one time, or, alternatively, occasionally allow a vessel or pipe to store larger than usual quantities (e.g., during turnaround). You do not need to consider the possible causes of the worst-case release or the probability that such a release might occur; the release is simply assumed to take place.

Release Height. All releases are assumed to take place at ground level for the worst-case analysis. This is a conservative assumption in most cases. Even if you think a ground-level release is unlikely at your site, you must use this assumption for the worst-case analysis.

Wind Speed and Atmospheric Stability. Meteorological conditions for the worst-case scenario are defined in the rule as atmospheric stability class F (stable atmosphere) and wind speed of 1.5 meters per second (3.4 miles per hour). If,

however, you can demonstrate that the minimum wind speed at your site (measured at 10 meters) has been higher than 1.5 meters per second, or that the maximum atmosphere stability has always been less stable than class F, you may use the minimum wind speed and most stable atmospheric conditions at your site for the worst-case analysis. To demonstrate higher minimum wind speeds or less stable atmospheric conditions, you will need to document local meteorological data from the previous three years that are applicable to your site. If you do not keep weather data for your site (most sources do not), you may call another nearby source, such as an airport, or a compiler, such as the National Weather Service, to determine wind speeds for your area. Exhibit 3-1 in Chapter 3 describes atmospheric stability classes in relation to wind speed and cloud cover. Your airport or other source will be able to give you information on cloud cover. A small difference in wind speed probably will not lead to a significant decrease in the distance to the endpoint.

Temperature and Humidity. For the worst-case release of a regulated toxic substance, you must assume the highest daily maximum temperature that occurred in the previous three years (the highest temperature reached in the last three years) and the average humidity for the site. If you have not kept information on temperature and humidity at your site, you may obtain it from a local meteorological station. EPA's *RMP Offsite Consequence Analysis Guidance* assumes a temperature of 25°C (77°F) and 50 percent humidity. If you use the EPA's guidance for your offsite consequence analysis, you may use these assumptions even if the actual highest temperature at your site is higher or lower. If the temperature at your site is significantly lower, EPA's guidance may give overly conservative results, particularly for toxic liquids. Small differences in temperature and humidity are unlikely to have a major effect on results, however.

Topography. Two choices are provided for topography for the worst-case scenario. If your site is located in an area with few buildings or other obstructions, you should assume open (rural) conditions. If your site is in an urban location, or is in an area with many obstructions, you should assume urban conditions.

Gas or Vapor Density. For the worst-case analysis, you must use a model appropriate for the density of the released gas or vapor. Generally, for a substance that is lighter than air or has a density similar to that of air, you would use a model for neutrally buoyant vapors. The initial vapor density of a substance with respect to air can be estimated from its molecular weight, assuming air has a "molecular weight" of approximately 29. For a substance that is heavier than air (molecular weight greater than 29), you generally would use a dense gas model. There are cases where a dense gas model may be appropriate for a substance with molecular weight of 29 or less (e.g., release of a compressed gas as a cold vapor) or where a neutrally buoyant plume model may be appropriate for a substance with a higher molecular weight (e.g., release by slow evaporation, with considerable mixing with air). In addition, dense gases and vapors will become neutrally buoyant through mixing with air as they move downwind. If you can account for such conditions in modeling, you may do so.

ESTIMATING RELEASE RATES

Toxic Gases. Toxic gases include all regulated toxic substances that are gases at ambient temperature (temperature 25º C, 77º F). For the consequence analysis, the

total quantity in the single largest vessel or process line is assumed to be released as a gas over a period of 10 minutes, except in the case of gases liquefied by refrigeration under atmospheric pressure. The release rate (per minute) for a gas (not liquefied by refrigeration) is the total quantity released divided by 10. Passive mitigation measures (e.g., enclosure) may be taken into account in the analysis of the worst-case scenario. A 10-minute release must be assumed for gases regardless of the model you use.

Gases liquefied by refrigeration alone (not under pressure) and released into diked areas may be modeled as liquids at their boiling points, if the pool formed by the released liquid would be greater than one centimeter (0.39 inches) in depth. In this case, you may assume the liquefied gas is released from a pool by evaporation at the boiling point of the gas. If the refrigerated liquefied gas is not contained by passive mitigation, or if the pool formed would have a depth of one centimeter or less, you must treat the released substance as a gas released over 10 minutes. EPA's analysis indicated that pools of gas liquefied by refrigeration with a depth of one centimeter or less would evaporate so rapidly at their boiling points that treatment as gaseous releases over 10 minutes is reasonable.

Toxic liquids. For toxic liquids, you must assume that the total quantity in a vessel is spilled, forming a pool. For toxic liquids carried in pipelines, you must assume that the largest quantity that might be released from the pipeline forms a pool. Passive mitigation systems (e.g., dikes) may be taken into account in consequence analysis. You must assume that the total quantity spilled spreads instantaneously to a depth of one centimeter (0.39 inches) in an undiked area or covers a diked area instantaneously. You estimate the release rate to air as the rate of evaporation from the pool. To estimate the evaporation rate, you need to estimate the surface area of the pool. You can take into account the surface characteristics of the area into which the liquid would be spilled; for example, some models for pool evaporation will take into account the type of soil if the spill will take place in an unpaved area. Your modeling also should consider the length of time it will take for the pool to evaporate.

You may use any appropriate model to estimate the evaporation rate of a spilled regulated substance from a pool and estimate the air dispersion distance to the specified endpoint of the regulated substance. The release rate can then be used to estimate the distance to the endpoint.

ESTIMATING DISTANCE TO THE ENDPOINT

You may use any appropriate model, as discussed above, to estimate the distance to the endpoint specified in part 68 Appendix A for a release of a regulated toxic substance, using the required modeling assumptions.

WORST-CASE RELEASES OF FLAMMABLE SUBSTANCES

For the worst-case scenario involving a release of a regulated flammable substance (a flammable gas or volatile flammable liquid), you must assume that the total quantity of the flammable substance is released into a vapor cloud. A vapor cloud explosion is assumed to result from the release. You must estimate the distance to an endpoint to an overpressure level of 1 pound per square inch (psi) from the explosion of the vapor cloud.

As in the case of the worst-case release analysis for toxic substances, the worst-case distance to the endpoint for flammable substances is based on a number of very conservative assumptions. Release of the total quantity of a flammable substance in a vessel or pipe into a vapor cloud generally would be highly unlikely. Vapor cloud explosions are also unlikely events; in an actual release, the flammable gas or vapor released to air might disperse without ignition, or it might burn instead of exploding, with more limited consequences. The endpoint of 1 psi is intended to be conservative and protective; it does not define a level at which severe injuries or death would be commonly expected. An overpressure of 1 psi is unlikely to have serious direct effects on people; this overpressure may cause property damage such as partial demolition of houses, which can result in injuries to people, and shattering of glass windows, which may cause skin laceration from flying glass.

To carry out the worst-case consequence analysis for flammable substances, you may use a TNT-equivalent model (i.e., a model that estimates the explosive effects of a flammable substance by comparison with the effects of an equivalent quantity of the high explosive trinitrotoluene (TNT), based on the available combustion energy in the vapor cloud). Such models allow you to estimate the distance to a specific overpressure level, based on empirical data from TNT explosions. If you use a TNT-equivalent model, you must assume that 10 percent of the flammable vapor in the cloud participates in the explosion (i.e., you assume a 10 percent yield factor for the explosion). You do not have to use a TNT-equivalent model; other models are available that take into account more site-specific factors (e.g., degree of confinement of the vapor cloud). Generally, however, a TNT-equivalent model is the simplest to use.

NUMBER OF SCENARIOS

The number of worst-case scenarios you must analyze depends on several factors as discussed below. You only need to consider the hazard (toxicity or flammability) for which a substance is regulated (i.e., even if a regulated toxic substance is also flammable, you only need to consider toxicity in your analysis; even if a regulated flammable substance is also toxic, you only need to consider flammability).

PROGRAM 1 PROCESSES

To demonstrate that a process is eligible for Program 1 (see Chapter 2), you conduct a worst-case release analysis of it and that analysis must show that the distance to the specified endpoint for every regulated substance in the process is smaller than the distance to any public receptor. If you have several processes that may qualify for Program 1, you will have to carry out a worst-case analysis for each process to determine which qualify. You will need to report in the RMP the worst-case results for those processes you determine to be eligible for Program 1.

If the distance to the endpoint in the worst-case analysis is equal to or greater than the distance to any public receptor, the process would be in Program 2 or Program 3 (discussed below). When you consider possible eligibility of your processes for

Program 1, you may want to look particularly at processes containing flammable substances, which are likely to give shorter worst-case distances than toxic substances.

PROGRAM 2 AND 3 PROCESSES

For all your Program 2 and 3 processes together (see Chapter 2), you must carry out and report in the RMP one worst-case analysis for the regulated toxic substances and one worst-case analysis for the regulated flammable substances held above their threshold quantities. The basic purpose of the worst-case analysis is to identify all of the public receptors that could be affected by a worst-case release. The release that results in the greatest distance to an endpoint would affect the greatest number of public receptors so only that release (and not others affecting a subset of the those receptors) needs to be reported. The reported scenario for toxic substances must be the scenario estimated to result in the greatest distance to a specified toxic endpoint; for flammable substances, it must be the scenario estimated to lead to the greatest distance to 1 psi overpressure for a vapor cloud explosion. Additional worst-case analyses must be reported for toxic or flammable substances if a worst-case release from a different location at the facility potentially would affect different public receptors from those affected by the scenario giving the greatest distance.

IDENTIFYING THE "WORST" WORST-CASE SCENARIO

Toxics. To determine the scenario that gives the greatest distance to an endpoint for processes containing toxic substances, you may have to analyze more than one scenario, because the distances depend on more than simply the quantity in a process. For toxic liquids, for example, distances depend on the magnitude of the toxic endpoint, the molecular weight and volatility of the substance, and the temperature of the substance in the process, as well as quantity. A smaller quantity of a substance at an elevated temperature may give a greater distance to the endpoint than a larger quantity of the same substance at ambient temperature. In some cases, it may be difficult to predict which substance and process will give the greatest worst-case distance. You also may need to carry out analyses of worst-case scenarios for locations at significant distances from each other to determine whether different public receptors might be affected by releases.

Flammables. For flammable substances, the greatest quantity in a process is likely to give the greatest distance to the endpoint, but there may be variations, depending on heat of combustion and distance to the fenceline. You may have to carry out several analyses to identify the scenario that gives the greatest distance to the endpoint. As in the case of toxic substances, you also may need to carry out analyses for locations far apart from each other to determine whether different public receptors might be affected.

For both toxic and flammable substances, the worst-case distances should be considered only approximations.

QS & AS
WORST-CASE AND MITIGATION

Q. At my facility, if the worst-case release scenarios for regulated toxic substances and the worst-case scenario for regulated flammable substances involve the same process, must I analyze both?

A. Yes. If the worst-case release scenarios for regulated toxic substances and regulated flammable substances in Program 2 and 3 processes are associated with the same process, the two worst-case release scenarios must be analyzed separately.

Q. What measures qualify as "passive mitigation"?

A. Passive mitigation is defined in § 68.3 as "equipment, devices, or technologies that function without human, mechanical, or other energy input." Passive mitigation systems include building enclosures, dikes, and containment walls. Measures such as fire sprinkler systems, water curtains, valves, scrubbers, or flares would not be considered passive mitigation because they require human, mechanical, or energy input to function.

Q. When analyzing the worst-case scenario for regulated toxic substances, must I anticipate a specific cause (e.g., fire, explosion, etc.) of the scenario?

A. No. The worst-case analysis for a release of regulated toxic substances must conform to specific assumptions as identified in § 68.25(c) and (d). Anticipated causes of the release will not affect the analysis, and are not required. A specific cause may be considered in analyzing the alternative release scenarios although it is not a requirement.

Q. Would all of the regulated substances stored in a salt dome be assumed to be released in the worst-case scenario?

A. The worst case scenario for salt domes would be examined in a manner similar to that for underground storage tanks. Reservoirs or vessels sufficiently buried underground are passively mitigated or prevented from failing catastrophically. You should evaluate the failure of piping connected to underground storage for the worst-case and alternative scenarios.

Q. Are valves in piping considered administrative controls?

A. No, administrative controls are written procedures that limit the quantity stored or flowing through the pipes. Valves are considered active mitigation systems.

4.3 ALTERNATIVE RELEASE SCENARIOS

There are only a few required assumptions for the alternative scenario analysis. Exhibit 4-4 summarizes the required assumptions.

EXHIBIT 4-4
REQUIRED PARAMETERS FOR MODELING ALTERNATIVE SCENARIOS

Endpoints

- For toxic substances, use the endpoints specified in part 68, Appendix A.
- For flammable substances, use as the endpoints:
  - Overpressure of 1 pound per square inch (psi) for vapor cloud explosions,
  - Radiant heat of 5 kilowatts per square meter (kW/m^2) (or equivalent dose) for fireballs or pool fires, or
  - Lower flammability limit (LFL) for vapor cloud fires.

Wind speed/stability

- Use typical meteorological conditions at your site.

Ambient temperature/humidity

- Use average temperature/humidity data gathered at your site or at a local meteorological station.

Height of release

- Release height may be determined by the release scenario.

Topography

- Use urban or rural topography, as appropriate.

Dense or neutrally buoyant gases

- Tables or models used for dispersion of regulated toxic substances must appropriately account for gas density.

Temperature of released substance

- Substances may be considered to be released at a process or ambient temperature that is appropriate for the scenario.

ACCEPTABLE ALTERNATIVE SCENARIOS

Your alternative scenario for a covered process must be one that is more likely to occur than the worst-case scenario and that reaches an endpoint offsite, unless no such scenario exists. You do not need to demonstrate greater likelihood of occurrence or carry out any analysis of probability of occurrence; you only need to use reasonable judgement and knowledge of the process. If, using a combination of reasonable assumptions, modeling of a release of a regulated substance from a process shows that the relevant endpoint is not reached offsite, you can use the modeling results to demonstrate that a scenario does not exist for the process that will give an endpoint offsite. You must report an alternative scenario, however.

Release scenarios you should consider include, but are not limited to, the following, where applicable:

- Transfer hose releases due to splits or sudden uncoupling;
- Process piping releases from failures at flanges, joints, welds, valves and valve seals, and drains or bleeds;
- Process vessel or pump releases due to cracks, seal failure, drain bleed, or plug failure;
- Vessel overfilling and spill, or overpressurization and venting through relief valves or rupture disks; and
- Shipping container mishandling and breakage or puncturing leading to a spill.

For alternative release scenarios, you may consider active mitigation systems, such as interlocks, shutdown systems, pressure relieving devices, flares, emergency isolation systems, and fire water and deluge systems, as well as passive mitigation systems. Mitigation systems considered must be capable of withstanding the event that triggers the release while remaining functional.

You must consider your five-year accident history and failure scenarios identified in your hazard review or process hazards analysis in selecting alternative release scenarios for regulated toxic or flammable substances (e.g., you might choose an actual event from your accident history as the basis of your scenario). You also may consider any other reasonable scenarios.

The alternative scenarios you choose to analyze should be scenarios that you consider possible at your site. Although EPA requires no explanation of your choice of scenario, you should choose a scenario that you think you can explain to emergency responders and the public as a reasonable alternative to the worst-case scenario. For example, you could pick a scenario based on an actual event, or you could choose a scenario that you worry about, because circumstances at your site might make it a possibility. If you believe that there is no reasonable scenario that could lead to offsite consequences, you may use a scenario that has no offsite impacts for your alternative analysis. You should be prepared to explain your choice of such a scenario to the public, should questions arise.

ALTERNATIVE RELEASES OF TOXIC SUBSTANCES

To estimate distances to the endpoint for alternative releases of toxic substances, you need to identify reasonable scenarios for the regulated substances in covered processes at your site and model these scenarios using appropriate models. As noted above, for alternative release scenarios, you are permitted to take credit for both passive and active mitigation systems, or a combination if both are in place. Modeling alternative releases of toxic substances is discussed below.

Although alternative scenarios are intended to be more likely than worst-case scenarios, the analysis of alternative scenarios should not be expected to provide realistic estimates of areas in which the public might be endangered in case of a release. The same conservative, protective endpoints are used for alternative release analysis as for worst-case analysis. These endpoints are intended to represent

exposure levels below which most members of the public will not suffer any serious health effects. The endpoints are based on exposures for longer periods than may be likely in an actual release. In addition, modeling carried out to estimate distances to these endpoints, even when based on more realistic assumptions than used for the worst-case modeling, likely will provide results with a high degree of uncertainty. These estimated distances should not be considered a necessarily accurate prediction of the results of an actual release.

MODELING ASSUMPTIONS

Quantity. EPA has not specified any assumptions you must make concerning quantity released for an alternative release scenario. You could consider any site-specific factors in developing a reasonable estimate of quantity released (e.g., the quantity that could be released from a sheared pipe in the time it would take to shut off flow to the pipe).

Release Height. You may assume any appropriate release height for your alternative scenarios. For example, you may analyze a scenario in which a regulated substance would be released at a height well above ground level.

Wind Speed and Atmospheric Stability. You should use typical meteorological conditions at your site to model alternative scenarios. To determine typical conditions, you may need to obtain local meteorological data that are applicable to your site. If you do not keep weather data for your site (most sources do not), you may call another nearby source, such as an airport, or a compiler, such as the National Weather Service, to determine wind speeds for your area. Your airport or other source will be able to give you information on cloud cover.

ESTIMATING RELEASE RATES

Toxic Gases. To estimate a release rate for toxic gases, you may make any appropriate assumptions based on conditions at your site and use any appropriate model. EPA's *RMP Offsite Consequence Analysis Guidance* provides a simple equation and chemical-specific data for estimating the release rate of a gas from a hole in a vessel or pipe based on hole size, tank pressure, and chemical properties. The size of the hole might be estimated from, for example, the hole size that would result from shearing off a valve or pipe from a vessel.

Tank or pipe damage or failure resulting in the release of a gas liquefied under pressure might be an appropriate alternative scenario at some sites. If such a release would be possible at your site, you may need to consider a model or method that will deal with this type of scenario.

You also should consider the duration of the release. EPA does not require you to assume any specific time period for the release. You could estimate the release duration based on the length of time it would take to stop the release, or you could estimate a maximum duration based on a calculated release rate and the quantity in the tank or pipes. If you estimate that a release of toxic gas would be stopped very quickly, resulting in a "puff" rather than a plume, you may want to use a model that

deals with puff releases. EPA's *RMP Offsite Consequence Analysis Guidance* is not appropriate for estimating distance to an endpoint for puff releases.

You may consider both passive and active mitigation in estimating release rates. For gases, passive mitigation may include enclosed spaces. Active mitigation for gases may include an assortment of techniques including automatic shutoff valves, rapid transfer systems (emergency deinventory), and water/chemical sprays. These mitigation techniques have the effect of reducing either the release rate or the duration of the release, or both. EPA's *RMP Offsite Consequence Analysis Guidance* includes methods of accounting for mitigation. You also may use your knowledge or other methods to account for mitigation.

Toxic liquids. For alternative releases of toxic liquids, you may consider any scenario that would be reasonable for your site. For alternative release scenarios, you are permitted to take credit for both passive and active mitigation systems, or a combination if both are in place. For liquids, passive mitigation may include techniques such as dikes and trenches. Active mitigation for liquids may include an assortment of techniques including automatic shutoff valves, emergency deinventory, foam or tarp coverings, and water or chemical sprays. These mitigation techniques have the effect of reducing either the quantity released into the pool or the evaporation rate from the pool. EPA's *RMP Offsite Consequence Analysis Guidance* discusses some methods of accounting for mitigation.

ESTIMATING DISTANCE TO THE ENDPOINT

For worst-case releases, you may use any appropriate model (as discussed in 4.1) to estimate the distance to the specified endpoint for an alternative release of a regulated toxic substance. You may use site-specific conditions, including typical weather conditions, and consider any site-specific factors appropriate to your scenario. You must use the endpoints specified in part 68 Appendix A, as for the worst-case analysis.

ALTERNATIVE RELEASES OF FLAMMABLE SUBSTANCES

Alternative release scenarios for flammable substances are somewhat more complicated than for toxic substances because the consequences of a release and the endpoint of concern may vary. For the worst case, the consequence of concern is a vapor cloud explosion, with an overpressure endpoint. For alternative scenarios involving fires rather than explosions, other endpoints than overpressure (e.g., heat radiation) may need to be considered. The rule specifies endpoints for fires based on the heat radiation level that may cause second degree burns from a 40-second exposure and the lower flammability limit (LFL), which is the lowest concentration in air at which a substance will burn. Some possible scenarios involving flammable substances are discussed below.

- **Vapor cloud fires** (flash fires) may result from dispersion of a cloud of flammable vapor and ignition of the cloud following dispersion. Such a fire could flash back and could represent a severe heat radiation hazard to anyone in the area of the cloud. Vapor cloud fires may be modeled using air

dispersion modeling techniques to estimate distances to a concentration equal to the LFL.

- A **pool fire**, with potential radiant heat effects, may result from a spill of a flammable liquid. The endpoint for this type of fire, as listed in the rule, is a radiant heat level of 5 kilowatts per square meter (kW/m2) for 40 seconds; a 40-second exposure to this heat level could cause second degree burns.

- A **boiling liquid, expanding vapor explosion (BLEVE)**, leading to a fireball that may produce intense heat, may occur if a vessel containing flammable material ruptures explosively as a result of exposure to fire. Heat radiation from the fireball is the primary hazard; vessel fragments and overpressure from the explosion also can result. BLEVEs are generally considered unlikely events; however, if you think a BLEVE is possible at your site, you should estimate the distance at which radiant heat effects might lead to second degree burns. However, if you think a BLEVE is possible at your site, you should estimate the distance at which radiant heat effects might cause second degree burns, since that is the effect of concern underlying the rule's endpoint for fires. The point of offsite consequence analyses is to determine how far away from the point of release effects of concern could occur, so you should estimate the distance for BLEVEs even if they do not last for 40 seconds. For short-duration BLEVEs, you would need to estimate the radiant heat level at which exposure for the duration of the BLEVE would cause second degree burns. You then would need to estimate the distance to that heat level. You then would need to estimate the distance to that heat level. You also may want to consider models or calculation methods to estimate effects of vessel fragmentation, although you are not required to analyze such effects.

- For a **vapor cloud explosion** to occur, rapid release of a large quantity of flammable material, turbulent conditions (caused by a turbulent release or congested conditions in the area of the release, or both), and other factors are generally necessary. Vapor cloud explosions generally are considered unlikely events; however, if conditions at your site are conducive to vapor cloud explosions, you may want to consider a vapor cloud explosion as an alternative scenario. The 1 psi overpressure endpoint still applies to a vapor cloud explosion for purposes of analyzing an alternative scenario, but you could use less conservative assumptions than for the worst-case analysis, including any reasonable estimate of the quantity in the cloud and the yield factor. A vapor cloud deflagration, involving lower flame speeds than a detonation and resulting in less damaging blast effects, is more likely than a detonation. You may assume a vapor cloud deflagration for the alternative scenario, if you think it is appropriate, and use the radiant heat endpoint (adjusted for duration).

- A **jet fire** may result from the puncture or rupture of a tank or pipeline containing a compressed or liquefied gas under pressure. The gas discharging from the hole can form a jet that "blows" into the air in the direction of the hole; the jet then may ignite. Jet fires could contribute to BLEVEs and fireballs if they impinge on tanks of flammable substances. A large horizontal

jet fire may have the potential to pose an offsite hazard. You may want to consider a jet fire as an alternative scenario, if appropriate for your site.

MODELING ASSUMPTIONS

Quantity. EPA has not specified any assumptions you must make concerning quantity released for alternative scenario analysis for flammable substances. You may consider any site-specific factors in developing a reasonable estimate of quantity released, as for toxic substances (e.g., the quantity that could be released from a ruptured pipe in the time it would take to shut off flow to the pipe).

Release Height. You may assume any appropriate release height for your alternative scenarios for flammable substances.

Wind Speed and Atmospheric Stability. Meteorological conditions may have little effect on some scenarios for flammable substances (e.g., vapor cloud explosions and BLEVEs), but may have a relatively large effect on others (e.g., a vapor cloud fire resulting from downwind dispersion of a vapor cloud and subsequent ignition). You should use typical meteorological conditions at your site to model appropriate alternative scenarios. To determine typical conditions, you may need to obtain local meteorological data that are applicable to your site, as discussed above.

ESTIMATING RELEASE RATES

Flammable Gases. To estimate a release rate for flammable gases, you may make any appropriate assumptions based on conditions at your site. You may consider the effects of both passive and active mitigation systems. The methods provided in EPA's *RMP Offsite Consequence Analysis Guidance* for rate of release of a gas from a hole in a vessel or pipe for toxic gases also can be used for flammable gases. Chemical-specific data are provided for flammable gases, to be used along with hole size and tank pressure to estimate release rates.

Flammable liquids. For alternative releases of flammable liquids, you may consider any scenario that would be reasonable for your site. You are permitted to take credit for both passive and active mitigation systems, or a combination if both are in place, as for toxic liquids. You could consider release of the liquid into a pool and release to air by pool evaporation, as for toxic liquids, if you consider this to be a reasonable scenario.

If evaporation of a flammable liquid from a pool is an appropriate assumption for your alternative scenario, you can use any scientifically appropriate method to estimate the evaporation rate.

ESTIMATING DISTANCE TO THE ENDPOINT

You may use any appropriate model to estimate the distance to the specified endpoint for alternative scenarios for regulated flammable substances. Several possible consequences of releases of flammable substances are discussed below.

Vapor cloud fire. You may use any appropriate model to estimate distances for a vapor cloud fire. The LFL endpoint, specified in the rule, would be appropriate for vapor cloud fires. You may use air dispersion modeling to estimate the maximum distance to the LFL. You may want to consider, however, whether it is likely that a flammable gas or vapor could disperse to the maximum distance to the LFL before reaching an ignition source. The actual dispersion distance before ignition might be much shorter than the maximum possible distance.

Pool fire. Any appropriate model may be used for pool fires of flammable liquids. The applicable endpoint specified in the rule is the heat radiation level of 5 kW/m^2.

BLEVE. If a fireball from a BLEVE is a potential release scenario at your site, you may use any model or calculation method to estimate the distance to a radiant heat level that can cause second degree burns (a heat "dose" equivalent to the specified radiant heat endpoint of 5 kW/m^2 for 40 seconds).

Vapor cloud explosion. If you have the potential at your site for the rapid release of a large quantity of a flammable vapor, particularly into a congested area, a vapor cloud explosion may be an appropriate alternative release scenario. For the alternative analysis, you may estimate any reasonable quantity of flammable substance in the vapor cloud. The endpoint for vapor cloud explosions is 1 psi, as for the worst case; however, a smaller yield factor may be used for the alternative scenario analysis.

NUMBER OF SCENARIOS

You are required to analyze at least one alternative release scenario for each listed toxic substance you have in a Program 2 or Program 3 process above its threshold quantity. Even if you have a substance above the threshold in several processes or locations, you need only analyze one alternative scenario for it. You also are required to analyze one alternative release scenario representing all regulated flammable substances in Program 2 or 3 processes; you do not need to analyze an alternative scenario for each flammable substance above the threshold. For example, if you have five listed substances — chlorine, ammonia, hydrogen chloride, propane, and acetylene — above the threshold in Program 2 or 3 processes, you will need to analyze one alternative scenario each for chlorine, ammonia, and hydrogen chloride (toxics) and a single alternative scenario to cover propane and acetylene (flammable substances).

No alternative scenario analysis is required for regulated substances in Program 1 processes. If the worst-case analysis shows no public receptors within the distance to the endpoint, and the process meets the other Program 1 criteria, you do not have to carry out an alternative scenario analysis.

In addition, no alternative scenario analysis is required for any process that does not contain more than a threshold quantity of a regulated substance, even if you believe such a process is a likely source of a release.

4.4 ESTIMATING OFFSITE RECEPTORS

The rule requires that you estimate in the RMP residential populations within the circle defined by the endpoint for your worst-case and alternative release scenarios (i.e., the center of the circle is the point of release and the radius is the distance to the endpoint). In addition, you must report in the RMP whether certain types of public receptors and environmental receptors are within the circles.

RESIDENTIAL POPULATIONS

To estimate residential populations, you may use the most recent Census data or any other source of data that you believe is more accurate. You are not required to update Census data or conduct any surveys to develop your estimates. Census data are available in public libraries and in the LandView system, which is available on CD-ROM (see box below). The rule requires that you estimate populations to two-significant digits. For example, if there are 1,260 people within the circle, you may report 1,300 people. If the number of people is between 10 and 100, estimate to the nearest 10. If the number of people is less than 10, provide the actual number.

Census data are presented by Census tract. If your circle covers only a portion of the tract, you should develop an estimate for that portion. The easiest way to do this is to determine the population density per square mile (total population of the Census tract divided by the number of square miles in the tract) and apply that density figure to the number of square miles within your circle. Because there is likely to be considerable variation in actual densities within a Census tract, this number will be approximate. The rule, however, does not require you to correct the number.

OTHER PUBLIC RECEPTORS

Other public receptors must be noted in the RMP (see the discussion of public receptors in Chapter 2). If there are any schools, residences, hospitals, prisons, public recreational areas or arenas, or commercial or industrial areas within the circle, you must report that. You are not required to develop a list of all public receptors; you must simply check off that one or more such areas is within the circle. Most receptors can be identified from local street maps.

ENVIRONMENTAL RECEPTORS

Environmental receptors are defined as natural areas such as national or state parks, forests, or monuments; officially designated wildlife sanctuaries, preserves, refuges, or areas; and Federal wilderness areas. Only environmental receptors that can be identified on local U.S. Geological Survey (USGS) maps (see box below) need to be considered. You are not required to locate each of these specifically. You are only required to check off in the RMP which specific types of areas are within the circle. If any part of one of these receptors is within your circle, you must note that in the RMP.

Important: The rule does not require you to assess the likelihood, type, or severity of potential impacts on either public or environmental receptors. Identifying them as within the circle simply indicates that they could be adversely affected by the release.

HOW TO OBTAIN CENSUS DATA AND LANDVIEW®

Census data can be found in publications of the Bureau of the Census, available in public libraries, including *County and City Data Book*.

LandView ®III is a desktop mapping system that includes database extracts from EPA, the Bureau of the Census, the U.S. Geological Survey, the Nuclear Regulatory Commission, the Department of Transportation, and the Federal Emergency Management Agency. These databases are presented in a geographic context on maps that show jurisdictional boundaries, detailed networks of roads, rivers, and railroads, census block group and tract polygons, schools, hospitals, churches, cemeteries, airports, dams, and other landmark features.

CD-ROM for IBM-compatible PCS
CD-TGR95-LV3-KIT $99 per disc (by region) or $549 for 11 disc set

U.S. Department of Commerce
Bureau of the Census
P.O. Box 277943
Atlanta, GA 30384-7943
Phone: 301-457-4100 (Customer Services -- orders)
Fax: (888) 249-7295 (toll-free)
Fax: (301) 457-3842 (local)
Phone: (301) 457-1128 (Geography Staff -- content)
http://www.census.gov/ftp/pub/geo/www/tiger/

Further information on LandView and other sources of Census data is available at the Bureau of the Census web site at www.census.gov.

HOW TO OBTAIN USGS MAPS

The production of digital cartographic data and graphic maps comprises the largest component of the USGS National Mapping Program. The USGS's most familiar product is the 1:24,000-scale Topographic Quadrangle Map. This is the primary scale of data produced, and depicts greater detail for a smaller area than intermediate-scale (1:50,000 and 1:100,000) and small-scale (1:250,000, 1:2,000,000 or smaller) products, which show selectively less detail for larger areas.

U.S. Geological Survey
508 National Center
12201 Sunrise Valley Drive
Reston, VA 20192
www.mapping.usgs.gov/

To order USGS maps by fax, select, print, and complete one of the online forms and fax to 303-202-4693. A list of commercial dealers also is available at www.mapping.usgs.gov/esic/usimage/dealers.html/. For more information or ordering assistance, call 1-800-HELP-MAP, or write:

USGS Information Services
Box 25286
Denver, CO 80225

For additional information, contact any USGS Earth Science Information Center or call 1-800-USA-MAPS.

Qs and As
OFFSITE CONSEQUENCE ANALYSIS

Q. How close must a stationary source be to a weather station for that station's data to be applicable to the stationary source?

A. EPA has not set specific distance limits, but will allow owners and operators to use reasonable judgement in determining whether data from a weather station is applicable to the stationary source. Factors such as topography and distance between the stationary source and a weather station should be taken into consideration when evaluating the applicability of the weather station's data to the stationary source.

Q. Must air dispersion models that are used to analyze worst-case release scenarios be able to account for multiple vessels and how those vessels could impact one another in the event of an accidental release?

A. No. Models used for worst-case release scenario analysis do not need to consider compounding effects of accidental releases from multiple vessels because worst-case release is defined by the rule as a single vessel or process line failure that will result in the greatest distance to an endpoint.

Q. If the estimated population changes, would the RMP have to be updated?

A. No. Changes in U.S. Census data do not necessitate the revision of the RMP. However, all updates to the RMP should use the most recent U.S. Census data.

Q. What if a flammable event has a different time duration than the 5 kw/m^2 for 40 seconds?

A. EPA recognizes that flammable events may occur for a different amount of exposure time. Therefore, the owner or operator should determine the distance to an equivalent exposure - e.g. if the flammable event occurs for 20 seconds, what is the distance to an equivalent exposure (XX kw/m^2)?

Q. Could positive buoyancy models be used?

A. Yes, provided there is a basis for use and the owner or operator explains the rationale for use of positive buoyancy models.

EXAMPLES OF WORST CASE

EXAMPLE ▸ SOURCE A

Source A, a ceramics manufacturer, has only one process on site containing a regulated substance above its threshold quantity: a storage tank containing more than 10,000 pounds of the flammable substance propane. A worst-case analysis is carried out for the propane tank, assuming release to air of the total contents of the tank resulting in a vapor cloud explosion. The distance to the 1 psi overpressure is estimated to be 0.17 miles. The tank is 300 yards inside the fenceline; the nearest public receptor is 100 yards from the fenceline, or 400 yards (0.23 miles) from the tank. The distance to the nearest public receptor is greater than the distance to the endpoint; therefore, Source A's only regulated process is eligible for Program 1. Source A must report the worst-case analysis to demonstrate eligibility for Program 1.

EXAMPLE ▸ SOURCE B

Source B, a small propane retailer, has one covered process on site, an 18,000-gallon propane tank. This tank holds a maximum of 65,000 pounds of propane. Source B must carry out a worst-case analysis for this process. The distance to a 1 psi overpressure for a vapor cloud explosion of 65,000 pounds of propane is estimated to be 0.32 miles. The retailer is located in a commercial area, and several small businesses border the facility and are within the distance to the endpoint; therefore, Source B's process is not eligible for Program 1. Source B must report the worst-case analysis in the RMP.

EXAMPLE ▸ SOURCE C

Source C, a retail operation that supplies ammonia and propane, has two covered processes: a 200-ton ammonia storage tank and an 18,000-gallon propane storage tank containing a maximum quantity of about 65,000 pounds. Source C carries out worst-case consequence analyses for both of these processes, with the following results:

- For 400,000 pounds of anhydrous ammonia, the distance to the specified endpoint (0.14 mg/L) is estimated as more than 10 miles; and
- For a vapor cloud explosion of 65,000 pounds of propane, the distance to an endpoint is estimated as 0.32 miles.

Residences and a business center are located within 0.15 miles of the facility; therefore, neither regulated process is eligible for Program 1. Source C must report the results of both worst-case analyses (one for toxic substances and one for flammable substances) in the RMP.

EXAMPLE ▸ SOURCE D

Source D is a medium-sized metal products manufacturer with two processes containing regulated toxic substances above their thresholds: a tank storing 50,000 pounds of 37 percent hydrochloric acid for use in plating processes and five interconnected, one-ton tanks of chlorine used in a wastewater treatment plant. Only one worst-case analysis is required for toxic substances for Program 2 and Program 3 processes; because of the greater toxicity and volatility of chlorine, Source D expects that a worst-case release of chlorine would result in the greatest distance to the endpoint. Source D does not believe the hydrochloric acid process would be eligible for Program 1 because of the proximity of public receptors (including workers at an adjacent industrial facility), and, therefore, only carries out the worst-case analysis for the chlorine process. A distance of 2.80 miles to the endpoint is estimated for a release of 2,000 pounds of chlorine gas. Source D must report this worst-case analysis in the RMP.

EXAMPLE ▸ SOURCE E

Source E is an inorganic chemical manufacturer with two covered processes: a tank containing 10 tons of 70 percent hydrofluoric acid solution and ten one-ton tanks of chlorine on a rack for wastewater treatment. Source E must carry out one worst-case analysis for regulated toxic substances for Program 2 and Program 3 processes. Because the toxic endpoint of chlorine is lower than that of hydrofluoric acid, and because the release rate will probably be greater for a gas than a solution, Source E decides to carry out the analysis for chlorine as the required worst-case analysis for toxic substances. Source E believes the hydrofluoric acid process may be eligible for Program 1 and, therefore, decides to do a worst-case analysis for this process as well. Results of the worst-case analyses for these two processes are:

- ✦ 2.80 miles for 2,000 pounds of chlorine
- ✦ 1 mile for 20,000 pounds of 70 percent hydrofluoric acid (released in a diked area)

Homes and businesses are located less than a mile from either process; therefore, the hydrofluoric acid process is not eligible for Program 1. Source E must report the results of the analysis for chlorine in the RMP.

EXAMPLE ▸ SOURCE F

Source F is a large chemical manufacturer with 11 regulated substances above their threshold quantities, including three flammable substances and eight toxic substances. The processes containing flammable substances are: three 18,000-gallon tanks containing 26,000 pounds of ethylene, 66,000 pounds of propylene, and 65,000 pounds of propane. The largest quantities of toxic substances in processes are: 25,000 pounds of toluene diisocyanate (TDI), 100,000 pounds of chloroform, 25,000 pounds of anhydrous hydrogen chloride, 20,000 pounds of chlorine, 80,000 pounds of epichlorohydrin, 100,000 pounds of methyl chloride, 10,000 pounds of hydrogen cyanide, and 1,000 pounds of phosgene. For the RMP, Source F has to report one worst-case analysis for flammable substances and one for toxic substances; however, Source F believes the processes containing flammable substances may be eligible for Program 1 and, therefore, chooses to carry out a worst-case analysis for each of these processes. In addition, Source F believes the processes containing TDI and chloroform may be eligible for Process 1, because of the low volatility of TDI and the relatively low toxicity of chloroform, and decides to carry out analyses to determine eligibility. Source F is not sure which of the other processes containing toxic substances will give the greatest distance to the endpoint; therefore, it conducts screening analyses for all these processes. The worst-case distances for vapor cloud explosions of the flammable substances are:

- 0.24 miles for 26,000 pounds of ethylene;
- 0.32 miles for 66,000 pounds of propylene; and
- 0.32 miles for 65,000 pounds of propane.

The worst-case distances to the endpoints for the toxic substances are:

- 0.06 miles for 25,000 pounds of TDI;
- 0.49 miles for 100,000 pounds of chloroform;
- 4.8 miles for 25,000 pounds of hydrogen chloride;
- 10 miles for 20,000 pounds of chlorine;
- 2.2 miles for 80,000 pounds of epichlorohydrin;
- 2.0 miles for 100,000 pounds of methyl chloride;
- 5.2 miles for 10,000 pounds of hydrogen cyanide; and
- 11 miles for 1,000 pounds of phosgene.

The processes containing ethylene and propylene are located 500 yards (0.28 miles) from a river (0.5 miles wide). The distance to the endpoint for these two processes does not extend beyond the river, which is not a recreational area; the processes are eligible for Program 1 (having met the other criteria). The propane tank is located 200 yards (0.11 miles) from another facility; the distance to the endpoint reaches this other facility; the propane process is not eligible for Program 1. The distances to the endpoints for the TDI process is exceeded by the distance to public receptors in any direction; therefore, this process is also eligible for Program 1.

Source F reports the worst-case analysis results for ethylene, propylene, and TDI to demonstrate eligibility for Program 1. It reports the results for propane as the required worst-case analysis for flammable substances and the results for phosgene as the required worst-case analysis for toxic substances.

EXAMPLES OF ALTERNATIVE RELEASES

EXAMPLE ▸ SOURCE A

Source A's only covered process (a tank containing 10,000 pounds of the flammable substance, propane) is in Program 1, because the worst-case analysis showed no public receptors within the distance to the endpoint. Therefore, Source A does not have to carry out an alternative scenario analysis.

EXAMPLE ▸ SOURCE B

Source B, a small propane retailer, has one covered process on site, an 18,000-gallon tank with a maximum of 65,000 pounds of propane. The worst-case analysis showed public receptors within the distance to the endpoint; the propane process is thus not eligible for Program 1, and instead is in Program 2. Source B must carry out an alternative scenario analysis for this process. Source B can choose any reasonable scenario for this analysis, considering site characteristics. Source B must be able to explain its choice, should questions arise.

EXAMPLE ▸ SOURCE C

Source C, a retail operation that supplies ammonia and propane, has two covered processes: an 18,000-gallon propane storage tank containing 65,000 pounds of propane (a regulated flammable substance) and an ammonia storage tank containing 400,000 pounds of anhydrous ammonia (a regulated toxic substance). The worst-case consequence analyses for these processes indicated neither is eligible for Program 1. Source C must carry out and report an alternative scenario analysis for each of these processes. Any reasonable and defensible scenarios can be analyzed for these processes.

EXAMPLE ▸ SOURCE D

Source D is a medium-sized metal products manufacturer with two covered processes containing regulated toxic substances: a chlorine wastewater treatment plant with 10,000 pounds of chlorine and a tank containing 50,000 pounds of 37 percent hydrochloric acid. Because of the proximity of public receptors, neither of these processes is eligible for Program 1. Source D must carry out and report an alternative scenario analysis for each of these processes. Source D may analyze any scenarios that are reasonable for the site and processes; the source must be able to explain its choice of scenarios.

EXAMPLE ▸ SOURCE E

Source E is an inorganic chemical manufacturer with two covered processes, one containing 20,000 pounds of chlorine and the other containing 20,000 pounds of 70 percent hydrofluoric acid. Source E's worst-case analyses indicated that these processes are not eligible for Program 1. Source E must carry out and report an alternative scenario analysis for each of these processes. The scenarios may be developed based on any reasonable and defensible assumptions.

EXAMPLE ▸ SOURCE F

Source F is a large chemical manufacturer with covered processes containing three regulated flammable substances and eight regulated substances. The worst-case analyses showed that the processes containing the flammable substances ethylene and propylene are eligible for Program 1, but a tank containing propane is not eligible. For flammable substances, Source F must carry out and report one alternative scenario analysis, to represent all regulated flammable substsances, for the tank with 65,000 pounds propane based on any reasonable assumptions.

The worst-case analyses showed that the process containing 25,000 pounds of the toxic substance toluene diisocyanate (TDI) also is eligible for Program 1; therefore, Source F does not need to carry out an alternative scenario analysis for TDI. Source F must carry out and report an alternative scenario analysis for each regulated toxic substance in a covered non-Program 1 process; thus, scenarios must be developed and analyzed for hydrogen chloride, chlorine, epichlorohydrin, methyl chloride, hydrogen cyanide, chloroform, and phosgene. If the substances are found in more than one vessel, the analysis should be conducted with respect to the vessel that presents the greatest relative risk of a release. Analyses of each vessel are not needed. Source F can develop any reasonable scenarios for these substances.

CHAPTER 5: MANAGEMENT SYSTEM

5.1 GENERAL INFORMATION (§68.15)

If you have at least one Program 2 or Program 3 process (see Chapter 2 for guidance on determining the Program levels of your processes), the management system provision in § 68.15 requires you to:

Develop a management system to oversee the implementation of the risk management program elements;

Designate a qualified person or position with the overall responsibility for the development, implementation, and integration of the risk management program elements; and

Document the names of people or positions and define the lines of authority through an organizational chart or other similar document, if you assign responsibility for implementing individual requirements of the risk management program to people or positions other than the person or position with overall responsibility for the risk management program.

ABOUT THE MANAGEMENT SYSTEM PROVISION

Management commitment to process safety is a critical element of your facility's risk management program. Management commitment should not end when the last word of the risk management plan is composed. For process safety to be a constant priority, your facility must remain committed to every element of the risk management program.

This rule takes an integrated approach to managing risks. Each element must be implemented on an ongoing, daily basis and become a part of the way you operate. Therefore, your commitment and oversight should be continuous.

By satisfying the requirements of this provision, you are ensuring that:

- The risk management program elements are integrated and implemented on an ongoing basis; and
- All groups within a source understand the lines of responsibility and communication.

5.2 HOW TO MEET THE MANAGEMENT SYSTEM REQUIREMENTS

We understand that the sources covered by this rule are diverse and that you are in the best position to decide how to appropriately implement and incorporate the risk management program elements at your facility; therefore, we sought to maximize your flexibility in complying with this program.

WHAT DOES THIS MEAN FOR ME AS A SMALL FACILITY?

As a small facility that must comply with this provision, you most likely have one or two Program 2 or 3 processes. To begin, you may identify either the qualified person or position with overall responsibility for implementing the risk management program elements at your facility. As a small facility, it may make sense and be practical to identify the name of the qualified person, rather than the position. Recognize that the only element of your management system that you must report in the RMP is the name of the qualified person or position with overall responsibility. Further, changes to this data element in your RMP do not require that you update your RMP.

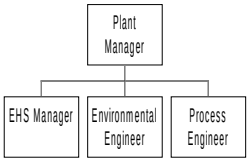
Identification of a qualified individual or position with overall responsibility may be all you need to do if the person or position named directly oversees the employees operating and maintaining the processes. You must define the lines of authority with an organizational chart or similar document only if you choose to assign responsibility for specific elements of the risk management program to persons or positions other than the person with overall responsibility. For a small facility, with few employees, it is likely that you will meet the requirements of this provision by identifying the one person or position with the overall responsibility of implementing the risk management program elements. If this is the case, you need not develop an organizational chart. For this reason, this chapter does not provide an example organizational chart for a small facility.

Even if you meet the requirements of this section by naming a single person or position, it is important to recognize that the person or position assigned the responsibility of overseeing implementation must have the ability and resources to ensure that your facility and employees carry out the risk management program, particularly the prevention elements, on an continuing basis. Key to the effectiveness of the rule is integrated management of the program elements.

WHAT DOES THIS MEAN FOR ME AS A MEDIUM OR LARGE FACILITY?

As a medium or large facility you may have more managerial turnover than smaller sites. For this reason, it may make more sense at your facility to identify a position, rather than the name of the specific person, with overall responsibility for the risk management program elements. Remember that the only element of your management system that you must report in the RMP is the name of the qualified person or position with overall responsibility. Also note that changes to this data element in your RMP do not require you to update your RMP.

Lines of Authority



As a relatively large or complex facility, you will likely choose to identify several people or positions to supervise the implementation of the various elements of the program; therefore, you must define the lines of authority through an organizational chart or similar document. Further, we expect that most facilities your size already have an interest in formalizing internal communication and have likely developed and maintained some type of documentation defining positions and responsibilities. Any internal documents you currently have should be the starting point for defining the lines of authority at your facility. You may find that you can simply use or update current documents to satisfy this part of the management system provision. Exhibit

5-1 provides a sample of another type of documentation you may use in addition to or as a replacement for an organization chart.

Defining the lines of authority and roles and responsibilities of staff that oversee the risk management program elements will help to:

- Ensure effective communication about process changes between divisions;
- Clarify the roles and responsibilities related to process safety issues at your facility;
- Avoid problems or conflicts among the various people responsible for implementing elements of the risk management program;
- Avoid confusion and allow those responsible for implementation to work together as a team; and
- Ensure that the program elements are integrated into an ongoing approach to identifying hazards and managing risks.

Remember that all of the positions you identify in your documentation will report their progress to the person with overall responsibility for the program. However, nothing in the risk management program rule prohibits you from satisfying the management provision by assigning process safety committees with management responsibility, provided that an organizational chart or similar document identifies the names or positions and lines of authority.

EXHIBIT 5-1
SAMPLE MANAGEMENT DOCUMENTATION

Position	Primary Responsibility	Changes	Responsibility re: Changes
Operations Manager	Developing OPs Oversight of operation On-the-job training On-the-job competency testing Process Safety Information Selecting participants for PHAs, incident investigations Develop management of change and pre-startup procedures	New Equipment New Process Chemistry New Process Parameters New Procedures Change in Process Utilization	Inform head of training Inform head of maintenance Inform lead for PHAs Inform hazmat team as needed Inform contractors
Training Supervisor	Develop, track, oversee operator training program Track competency testing Set up and track operator refresher training Set up training for maintenance Work with contractors	New Equipment New Process Chemistry New Process Parameters New Procedures Change in Process Utilization New regulatory requirements	Revise training and refresher training courses Revise maintenance courses, as needed Inform other leads of need for additional training
Maintenance Supervisor	Develop maintenance schedules Oversee and document maintenance Revise schedules as needed	New Equipment New Process Chemistry New Process Parameters New Procedures Change in Process Utilization	Inform operations manager of potential problem areas Inform training supervisor of any training revisions Inform contractors Revise schedules
Hazmat Team Chief	Develop and exercise ER plan Train responders Test and maintain ER equipment Coordinate with public responders Select participants in accident investigations	New Equipment New Process Chemistry New Process Parameters New Procedures Change in Process Utilization New regulatory requirements	Revise the ER plan as needed Inform operations manager of problems created by changes Work with training supervisor to revise training of team and others

EXHIBIT 5-1
SAMPLE MANAGEMENT DOCUMENTATION

Position	Primary Responsibility	Changes	Responsibility re: Changes
Health and Safety Officer	Oversee implementation of RMP Develop accident investigation procedures Oversee compliance audits Develop employee participation plans Conduct contractor evaluations Track regulations	New Equipment New Process Chemistry New Process Parameters New Procedures Change in Process Utilization New regulatory requirements	Inform all leads of new requirements and assign responsibilities Ensure that everyone is informed of changes and that changes are incorporated in programs as needed

CHAPTER 6: PREVENTION PROGRAM (PROGRAM 2)

6.1 ABOUT THE PROGRAM 2 PREVENTION PROGRAM

Most Program 2 processes are likely to be relatively simple and may be located at small businesses. EPA developed the Program 2 prevention program by identifying the basic elements that are the foundation of sound prevention practices — safety information, hazard review, operating procedures, training, maintenance, compliance audits, and accident investigation. By meeting other Federal regulations, state laws, industry codes and standards, and good engineering practices, you probably have already met most of the Program 2 prevention elements requirements.

As important as each of the elements is, you will not gain the full benefit from them unless you integrate them into a risk management system that you implement on an on-going basis. For example, the hazard review must be built on the safety information; the results of the hazard review should be used to revise and update operating and maintenance procedures. Workers must be trained in these procedures and must use them every day.

You will have substantially less documentation and recordkeeping responsibilities for a Program 2 process than you will for a Program 3 process. In addition, EPA is working with various industry sectors to develop industry-specific risk management programs for Program 2 and 3 processes. The industry-specific guidance will help by giving standard elements for the sector that can be adopted for a particular business in the sector. If there is an industry-specific program for your sector, you can skip this chapter and use that guidance.

There are seven elements in the Program 2 prevention program, which is set forth Subpart C of part 68. Exhibit 6-1 sets out each of the seven elements and corresponding section numbers.

You must integrate these seven elements into a risk management program that you and your staff implement on a daily basis. Understanding and managing risks must be part of the way you operate. Doing so will provide benefits beyond accident prevention. Preventive maintenance and routine inspections will reduce the number of equipment failures and down time; well-trained workers, aware of optimum operating parameters, will allow you to gain the most efficient use of your processes and raw materials.

6.2 SAFETY INFORMATION (§ 68.48)

The purpose of this requirement is to ensure that you understand the safety-related aspects of the equipment and processes you have, know what limits they place on your operations, and adopt accepted standards and codes where they apply. Having up-to-date safety information about your process is the foundation of an effective prevention program. Many elements (especially the hazard review) depend on the accuracy and thoroughness of the information this element requires you to provide.

EXHIBIT 6-1
SUMMARY OF PROGRAM 2 PREVENTION PROGRAM

Number	Section Title
§ 68.48	Safety Information
§ 68.50	Hazard Review
§ 68.52	Operating Procedures
§ 68.54	Training
§ 68.56	Maintenance
§ 68.58	Compliance Audits
§ 68.60	Incident Investigation

WHAT DO I NEED TO DO?

You must compile and maintain safety information related to the regulated substances and process equipment for each Program 2 process. You probably have much of this information already as a result of complying with OSHA standards or other rules. EPA has limited the information to what is likely to apply to the processes covered under the Program 2 program. Exhibit 6-2 gives a brief summary of the safety information requirements for Program 2.

HOW DO I START?

MSDSs. If you are subject to this rule, you are also subject to the requirements to maintain Material Safety Data Sheets under the OSHA Hazard Communication Standard (HCS) (29 CFR 1910.1200). If you do not have an MSDS for a regulated substance, you should contact your supplier or the manufacturer for a copy. Because the rule states that you must have an MSDS that meets OSHA requirements, you may want to review the MSDS to ensure that it is, in fact, complete. Besides providing the chemical name, the MSDS for a regulated substance (or a mixture containing the regulated substance) must describe the substance's physical and chemical characteristics (e.g., flash point, vapor pressure), physical hazards (e.g., flammability, reactivity), health hazards, routes of entry, exposure limits (e.g., the OSHA permissible exposure level), precautions for safe handling, generally applicable control measures, and emergency and first aid procedures. (See 29 CFR 1910.1200(g) for the complete set of requirements for an MSDS.)

EXHIBIT 6-2
SAFETY INFORMATION REQUIREMENTS

You must compile and maintain this safety information:	You must ensure:	You must update the safety information if:
✔Material Safety Data Sheets ✔Maximum intended inventory ✔Safe upper and lower parameters ✔Equipment specifications ✔Codes & standards used to design, build, and operate the process	✔That the process is designed in compliance with recognized codes and standards	✔There is a *major change* at your business that makes the safety information inaccurate

Maximum Inventory. You must document the maximum intended inventory of any vessel in which you store or process a regulated substance above its threshold quantity. If you are not sure of the capacity of the vessel, you can obtain this information from the manufacturer of the vessel. In some cases, this information will be attached to the vessel itself.

You may want to check with any trade association or standards group that develops standards for your industry to determine if there are any limitations on inventories. For example, in some cases the maximum capacity of a tank may be 10,000 gallons, but an industry standard may recommend that the tank never be filled to more than 85 percent capacity. If you follow the standard, your maximum inventory would be 8,500 gallons.

Storage and Process Limits. You must document the safe upper and lower temperatures and pressures, process flows (if applicable), and compositions (if applicable) for your process.

Every substance has limits on the temperature and pressures at which it can be stored or used; these limits are determined by both the properties of the substance and the vessels it which it is kept. If you do not know these limits, you should contact your vendor, the substance manufacturer, or your trade association. They will be able to provide the data you need. It is important that you know these limits so you can take action to avoid situations where these limits may be exceeded. Many people are aware of the dangers of overheating their vessels, but extreme low temperatures also may pose hazards you should know about.

If you are moving substances through pipes or hoses, you need to define safe temperatures and pressures for that movement; again, these limits will be determined by both the substance and the piping. For example, the substance may tolerate high pressures, but the pipes may have structural limits. To operate safely, you must have this information. The pipe manufacturer will be able to provide these data.

If you are reacting chemicals, you need to understand whether the reaction will be compromised if you vary the temperature or pressure. Again, it is important to define both the upper and lower limits. Reactions may become unstable outside of their limits and compromise safety. Check with the substance manufacturer for information on this subject if you are uncertain about the limits for particular substances you are using.

The requirement to compile and maintain information on process flows and compositions will apply to you if you transfer substances through piping or hoses and if you mix or react the substance. It is important in these cases that you understand the safe limits for flow and composition. The pipe or hose vendors will be able to provide you with the maximum flow rates that their products are designed to handle. You must also be aware of any hazards that could be created if your processes are contaminated; for example, if your substance or equipment could be contaminated by water, you must know whether that creates different hazards, such as corrosion.

For most Program 2 processes, reacting or mixing will not be an issue, but if you are mixing or reacting regulated substances, you should understand what will happen if the composition varies. If you are uncertain about the effects of changing composition and do not have a chemist or chemical engineer on your staff, the substance manufacturer should be able to help you.

Equipment Specifications. You must document the specifications of any equipment you use to store, move, or react regulated substances in a covered process. Equipment specifications will usually include information on the materials of construction, actual design, and tolerances. The vendor should be able to provide this information; you may have the specifications in your files from the time of purchase. You are not expected to develop engineering drawings of your equipment to meet this requirement, but you must be able to document that your equipment is appropriate for the substances and activities for which it is used, and you must know what the limits of the equipment are.

Specifications are particularly important if your vessels or pipes are not specifically designed for your type of operation. Substances may react with certain metals or corrode them if water is introduced. You should be sure that the vessels you purchase or lease are appropriate for your operations. Understanding equipment specifications will help you when you need to buy replacement parts. Any such parts must be appropriate for your existing equipment and your use of that equipment. It is not sufficient to replace parts with something that "fits" unless the new part meets the specifications; substitution of inappropriate parts may create serious hazards.

Codes and Standards. You must document the codes and standards you used to design and build your facility and that you follow to operate. These codes will probably include the electrical and building codes that you must comply with under state or local laws. Your equipment vendors will be able to provide you with information on the codes they comply with for their products. Exhibit 6-3 lists some codes that may be relevant to your operation. Note that the National Fire Protection Association (NFPA) codes may have been adopted as state or local codes. The American National Standards Institute (ANSI) is an umbrella standards-setting organization, which imposes a specific process for gaining approval of standards and

codes. ANSI codes may include codes and standards also issued by other organizations.

EXHIBIT 6-3
CODES AND STANDARDS

ORGANIZATION	SUBJECT/CODES
American National Standards Institute (ANSI)	Piping, Electrical, Power wiring, Instrumentation, Lighting, Product storage and handling, Insulation and fireproofing, Painting and coating, Ventilation, Noise and Vibration, Fire protection equipment, Safety equipment, Pumps, Compressors, Motors, Refrigeration equipment, Pneumatic conveying
American Society of Mechanical Engineers (ASME)	Power boilers, Pressure vessels, Compressors, Shell and tube exchangers, Vessel components, General design and fabrication codes
American Petroleum Institute (API)	Welded tanks, Rotating equipment, Bulk liquid storage systems
National Fire Protection Association (NFPA)	Fire pumps, Flammable liquid code, LNG storage and handling, Plant equipment and layout, Electrical system design, Shutdown systems, Pressure relief equipment, Venting requirements, Gas turbines and engines, Cooling towers, Storage tanks
American Society for Testing Materials (ASTM)	Inspection and testing, Noise and vibration, Materials of construction, Piping materials and systems, Instrumentation

HOW DO I DOCUMENT ALL THIS?

EPA does not expect you to develop piles of papers to document your safety information. Your MSDS(s) are usually three or four pages long. You only have to keep them on file, as you already do for OSHA. Equipment specifications are usually on a few sheets or in a booklet provided by the vendor; you need only keep these on file. You can probably document the other information on a single sheet that simply lists each of the required items and any codes or standards that apply. See Exhibit 6-4 for a sample. Maintain that sheet in a file and update it whenever any item changes or new equipment is added.

EXHIBIT 6-4
SAMPLE SAFETY INFORMATION SHEET

PROPANE STORAGE	
MSDS Propane	On file (1994)
Maximum Intended Inventory	400,000 pounds
Temperature	Upper: max 110°F Lower: min -15°F
Pressure	Upper: 240 psi @ 110°F Lower: 35 psi @ -15°F
Flow Rate	Loading: 100 GPM (max) Unloading: 265 GPM (max)
Vapor Piping	250 PSIG
Liquid Piping and Compressor Discharge	350 PSIG
Safety Relief Valves	Each relieves 9,250 SCFM/air RV 1 replaced 9/96 RV 2 replaced 6/97 RV 3 replaced 8/98
Excess Flow Valve	3", closes at 225 GPM with 100 PSIG inlet 2", closes at 100 GPM with 100 PSIG inlet 2", closes at 34,500 SCFH with 100 PSIG inlet
Emergency Shutoff Valve	ESV 1 1/4", closes at 26,000 SCFH with 100 PSIG inlet ESV 2", closes at 225 GPM with 100 PSIG inlet
Codes and Standards	Designed under NFPA-58-1985
Piping Design	ASME B31-3
Tank Design	ASME NB# 0012

The equipment specifications and list of standards and codes will probably meet the requirement that you ensure that your process is designed in compliance with recognized and generally good engineering practices. If you have any doubt that you are meeting this requirement, your trade association may be helpful in determining if there are practices or standards that you are not aware of that may be useful in your operation.

After you have documented your safety information, you should double check it to be sure that the files you have reflect the equipment you are currently using. It is important to keep this information up to date. Whenever you replace equipment, be sure that you put the new equipment specifications in the file and consider whether

any of your other prevention elements need to be reviewed to reflect the new equipment.

WHERE TO GO FOR MORE INFORMATION

MSDSs. MSDSs are available from a number of websites. The University of California, San Diego Chemistry and Biochemistry Department maintains some MSDSs on its website: http://www-ehs.ucsd.edu/msds.htm. This site also links to other pages with MSDSs, including Vermont Safety and Information Resources on the Internet, http://siri.org. On-line databases also provide MSDSs. EPA has not verified the accuracy or completeness of MSDSs on any of these sites nor does it endorse any particular version of an MSDS. You should review any MSDS you use to ensure that it meets the requirements of OSHA's hazard communication standard (29 CFR 1910.1200).

Guidance and Reports. Although the reports below target the chemical industry, you may find useful information in them:

- Guidelines for Process Safety Documentation, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1995.
- Loss Prevention in the Process Industries, Volumes I, II, and III, Frank P. Lees, Butterworths: London 1996.

6.3 HAZARD REVIEW (§ 68.50)

For a Program 2 process, you must conduct a hazard review. EPA has streamlined the process hazard analysis (PHA) requirement of OSHA's PSM standard to create a requirement that will detect process hazards at the simpler processes in Program 2. The hazard review will help you determine whether you are meeting applicable codes and standards, identify and evaluate the types of potential failures, and focus your emergency response planning efforts. Most Program 2 processes will covered by guidance for industry-specific risk management program guidance documents that will provide help with this hazard review.

WHAT DO I NEED TO DO?

The hazard review is key to understanding how to operate safely on a continuous basis. You must identify and review specific hazards and safeguards for your Program 2 processes. EPA lists the types of hazards and safeguards in the rule. Exhibit 6-5 summarizes things you must do for a hazard review.

EXHIBIT 6-5
HAZARD REVIEW REQUIREMENTS

Conduct a review & identify...	Use a guide for conducting the review.	Document results & resolve problems.	Update your hazard review.
✔The hazards associated with the Program 2 process & regulated substances. ✔Opportunities for equipment malfunction or human error that could cause a release. ✔Safeguards that will control the hazards or prevent the malfunction or error. ✔Steps to detect or monitor releases.	✔You may use any checklist (e.g., one provided in an industry-specific risk management program) to conduct the review. ✔For a process designed to industry standards like NFPA-58 or Federal /state design rules, check the equipment to make sure that it's fabricated, installed, and operated properly.	✔Your hazard review must be documented and you must show that you have addressed problems.	✔You must update your review at least once every five years or whenever there is a major change in the process. ✔You must resolve problems identified in the new review *before* you startup the changed process.

HOW DO I START?

There are three possible approaches to conducting a hazard review; which you use will depend on your particular situation.

Processes designed to legal or industry-specific codes. If your process was designed and built to comply with a federal or state standard for your industry or an industry-specific design code, your hazard review will be relatively simple. The standard-setting organization has already conducted a hazard review for that type of process, identified the hazards, and developed equipment and operating requirements to minimize the risks. You can use the code or standard as a checklist. The purpose of your review is to ensure that your equipment still meets the code and is being operated in appropriate ways.

If you have a single vessel or other simple equipment, you can probably conduct the review relatively quickly. You will need a copy of the code or standards and someone who is familiar with both the requirements and your equipment to ensure that the person can reasonably assess your compliance. If you have an operating engineer, he or she may be able to conduct the review. If you do not have any technical staff, your vendor or trade association may be able to help you. If you seek outside help, however, work with whoever conducts the review so that you understand what they find.

Industry checklist/industry-specific risk management program. If there is not a single code or standard you must meet, you may want to use a checklist developed by a third party, such as a national trade association. EPA and others are developing

guidance for industry-specific risk management programs for some industry sectors. These models will include checklists you can use as the basis of your review.

The trade association or model developers will have already identified what your hazards are and what types of equipment and procedures you should be using. Your job is to use the checklist to decide if you meet the requirements and, if you do not, whether you should. In some cases, your individual circumstances may make a checklist item unnecessary.

As with an industry-specific standard, if you have an operating engineer or an operator knowledgeable about the equipment and process, he or she may be able to conduct the review. If you do not have any technical staff, your vendor or trade association may be able to help you. If you seek outside help, however, work with whoever conducts the review so that you understand what they find.

If you use the standards and models, you may have to modify them to address the site-specific concerns. Never use someone else's checklist blindly. You must be sure that it addresses all of your potential problems.

Develop your own checklist. If you have no industry standards or checklists, you will have to conduct your own hazard review. As discussed in the requirements section (Exhibit 6-5), the review must identify:

- The hazards of the regulated substance and process;
- Possible equipment failures or human errors that could lead to a release;
- Safeguards used or needed to prevent failures or errors; and
- Steps used or needed to detect or monitor releases.

You will probably be able to define the hazards of the substance using the MSDS, which lists the hazardous properties of the substance. The hazards of the process (as opposed to the equipment) will be limited for most Program 2 processes. However, if you react or mix chemicals, or your process could be contaminated by water or other chemicals, you may have process hazards that you need to identify. Your safety information should help here.

The next step may be to conduct a simplified "What If" process, where your technical staff ask "What if it stops or fails?" for each piece of equipment and "What if the operator fails to do this?" for each procedure. Most industry standards and codes have already considered these questions and developed responses in terms of design standards and operating practices. If you are doing this on your own, the important thing to remember is that you should not assume that an equipment failure or human error will not happen. Ask whether the safeguards that you think protect the equipment or operator are really adequate. In many cases, they may be adequate, but it is useful to ask, to force yourself to examine your own assumptions.

From this exercise, you should develop a checklist of items that you need to take. For example, if you have listed mixing tank pump failure as a possible problem, the

checklist might then include the following items to check: pump maintenance plans, tank high-level alarms, overflow tanks. You would also want to ask what effect a power outage would have on the pump. You may want to consider the particular procedures that have to be followed for safe operation of the equipment and ask what will happen if an operator omits a step or does them out of order. Do your procedures address these possible problems? Will failure of the pump affect the safe operating limits you have documented in your safety information?

When you finish the checklist, it is useful to show it to your operators. They are familiar with the equipment and may be able to point out other areas of concern. A review with your vendors or trade association may also help; their wider knowledge of the industry may give them ideas about failures you may not have experienced or considered.

You may also use any of the other techniques described in Appendix 7A to Chapter 7. These techniques generally require more trained staff and more time; they are particularly appropriate for processes that involve reacting or manufacturing chemicals.

CAUTION

Whichever approach you use, you should consider reasonably anticipated external events as well as internal failures. If you are in an area subject to earthquakes, hurricanes, or floods, you should examine whether your process would survive these natural events without releasing the substance. In your hazard review, you should consider the potential impacts of lightning strikes and power failures. If your process could be hit by vehicles, you should examine the consequences of that. If you have anything near the process that could burn, ask yourself what would happen if the fire affected the process. For example, if you have a propane tank and an ammonia tank at your facility and they are close to each other, when you look at the ammonia tank you should consider what a fire in the propane tank would do to the ammonia. These considerations may not be part of standard checklists or model programs.

In addition, you may want to check with vendors, trade associations, or professional organizations to determine if there are new standards for safety systems or designs, or if there are detection or mitigation systems that may be applicable to your process that you should consider when you evaluate your existing equipment. If your equipment is designed and built to an earlier version of a standard, you should consider whether upgrades are needed.

RESPONDING TO FINDINGS

The person or persons who conduct the review should develop a list of findings and recommendations. You must ensure that problems identified are addressed in a timely manner. EPA does not require that you implement every recommendation. It is up to you to decide which recommendations are necessary and feasible. You may decide that other steps are as effective as the recommended actions or that the risk is too low to merit the expense. You must, however, document your decision on each recommendation. If you are implementing a recommendation, you should document the schedule for implementation. If you are taking other steps to address the problem or decide the problem does not merit action, you should document the basis for your decision.

DOCUMENTING THE REVIEW

You should maintain a copy of the checklist you used. The easiest way to document findings is to enter them on the checklist after each item. This approach will give you a simple, concise way of keeping track of findings and recommendations. You may also want to create a separate document of recommendations that require implementation or other resolution. Exhibit 6-6 is an extract from the checklist developed for the guidance for a propane risk management program; it provides a sample of the level of detail needed in a checklist and a format for documenting your findings.

EXHIBIT 6-6
SAMPLE CHECKLIST (EXTRACT)

Piping, Equipment, Container Appurtenances	Yes/No/NA	Comments
1. On installations with stairways and ladders, are catwalks provided so personnel need not walk on any portion of the vessel?		
2. Is piping designed in accordance with ASME B31.3, 1993 edition? Pump and compressor discharge and liquid transfer lines shall be suitable for a working pressure of 350 psi (3-2.8.2(a) of NFPA 58, 1995 edition) Vapor piping shall be suitable for a working pressure of 250 psi (3-2.8.2(b of NFPA 58, 1995 edition)		
3. Is the capacity of the pressure relief devices designed as specified in 2-3.2 and 3-2.5 of NFPA 58, 1995 edition?		
4. Are appropriate level gauges, temperature indicators, and pressure gauges installed on fixed ASME storage tanks as specified in 2-3.3.2(b), 2-3.3.3, 2.3.4, 2.3.5 of NFPA 58, 1995 edition?		

Piping, Equipment, Container Appurtenances	Yes/No/NA	Comments
5. Are appropriate hydrostatic relief valves installed between every section of liquid piping, which can be blocked by manual or automatic valves as specified in 2-4.7 and 3-2.9 of NFPA 58, 1995 edition?		
6. Is appropriate corrosion protection installed as required by 3-2.12 of NFPA 58, 1995 edition?		
7. On installations with pumps, are they installed as specified in 3-2.13 of NFPA 58, 1995 edition? On installations with an automatic bypass valve, are they installed on the discharge of the pump as specified in 3-2.13(b)(1) and 2-5.2 of NFPA 58, 1995 edition?		

UPDATES

You must update the review every five years or whenever a major change in a process occurs. For most Program 2 processes, major changes are likely to occur infrequently. If you install a new tank next to an existing one, you would want to consider whether the closeness of the two creates any new hazards. Replacing a tank with an identical tank would not be considered a change. Replacing a tank with a new type of tank should trigger an update. Changing process composition or safe operating limits is considered a major change. Even if changes prove to be minor, you should examine the process carefully before starting. Combining old and new equipment can sometimes create unexpected hazards. You will operate more safely if you take the time to evaluate the hazards before proceeding.

WHERE TO GO FOR MORE INFORMATION

Although the reports below target the chemical industry, you may find useful information in them:

- *Guidelines for Hazard Evaluation Procedures, 2nd Ed. with Worked examples*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1992.
- *Evaluating Process Safety in the Chemical Industry*, Chemical Manufacturers Association.
- *Loss Prevention in the Process Industries*, Volumes I, II, and III Frank P. Lees, Butterworths: London 1996.
- *Management of Process Hazards* (R.P. 750), American Petroleum Institute.
- *Risk-Based Decision Making (Publication 16288),* American Petroleum Institute.

6.4 OPERATING PROCEDURES (§ 68.52)

Written operating procedures describe in detail what tasks a process operator must perform, set safe process operating parameters that must be maintained, and set safety precautions for operations and maintenance activities. These procedures are the guide for telling your employees how to work safely everyday, giving everyone a quick source of information that can prevent or mitigate the effects of an accident, and providing workers and management with a standard against which to assess performance.

WHAT DO I NEED TO DO?

You must prepare written operating procedures that give workers clear instruction for safely conducting activities involving a covered process. You may use standardized procedures developed by industry groups or provided in industry-specific risk management program guidances as the basis for your operating procedures, but be sure to check that these standard procedures are appropriate for your activities. If necessary, you must update your Program 2 operating procedures whenever there is a major change and before you startup the changed process. Exhibit 6-7 briefly summarizes what your operating procedures must address.

EXHIBIT 6-7
OPERATING PROCEDURES REQUIREMENTS

Steps for each operating phase	Other Procedures
✔Initial startup	✔Consequences of deviating
✔Normal operations	✔Steps to avoid, correct deviations
✔Temporary operations	✔Equipment inspections
✔Emergency shutdown	
✔Emergency operations	
✔Normal shutdown	
✔Startup following a normal or emergency shutdown or a major change	

Your operating procedures must be:

- Appropriate for your equipment and operations;
- Complete; and
- Written in language that is easily understood by your operators.

The procedures do not have to be long. If you have simple equipment that requires a few basic steps, that is all you have to cover.

HOW DO I START?

If you already have written procedures, you may not have to do anything more. Review the procedures. You may want to watch operators performing the steps to be sure that the procedures are being used and are appropriate. Talk with the operators to identify any problems they have identified and any improvements they may have made. When you are satisfied that they meet the criteria listed above, you are finished. You may want to check them against any recommended procedures provided by equipment manufacturers, trade associations, or standard setting organizations, but you are not required to do so. You are responsible for ensuring that the procedures explain how to operate your equipment and processes safely.

If you do not have written procedures, you may be able to review your standard procedures with your operators and write them down. You also may want to check with equipment manufacturers, trade associations, or standard setting organizations. They may have recommended practices and procedures that you can adapt. Do not accept anyone else's procedures without checking to be sure that they are adequate and appropriate for your particular equipment and uses and are written in language that your operators will understand. You may also want to review any requirements imposed under state or federal rules. For example, if you are subject to federal rules for loading and unloading of hazardous materials, those rules may dictate some procedures. Copies of these rules are sufficient for those operations if your operators can understand and use them.

WHAT DO THESE PROCEDURES MEAN?

The rule lists eight procedures. Not all of them may be applicable to you. The following is a brief description to help you decide whether you need to develop procedures for each item. If a particular element does not apply, do not spend any time on it. We do not expect you to create a document that is meaningless to you. You should spend your time on items that will be useful to you.

Initial Startup. This item applies primarily to facilities that process or use substances and covers all the steps you need to take before you start a process for the first time. You should include all the steps needed to check out equipment as well as the steps needed to start the process itself. If you simply store a regulated substance, there is no startup. Warehouses, for example, will probably not have procedures for startup. Retailers who store a substance and download it should have procedures for checking out and loading the vessel for the first time for this item.

Normal Operations. These procedures should cover your basic operations. If you are a warehouse, these would include stacking, moving, and repackaging, if you do that. For retailers, they would cover loading and downloading. For users, the procedures would include all the steps operators take to check the process and ensure that equipment is functioning properly and substances are flowing or mixing appropriately. These are your core procedures that you expect your operators to follow on a daily basis to run your processes safely.

Temporary Operations. These operations are short-term; they will usually occur either when your regular process is down or when additional capacity is needed for a

limited period. The procedures should cover the steps you need to take to ensure that these operations will function safely. The procedures will generally cover pre-startup checks and determinations (e.g., have you determined what the maximum flow rate will be). The actual operating procedures for running the temporary process must be written before the operation is put into place.

This item may apply to most facilities. Even warehouses may need to consider procedures to ensure that if a new substance or product is brought into the warehouse for temporary storage, the necessary steps are taken before that storage to ensure that it is safe (e.g., barrels are not stacked too high or located with incompatible substances). If it is possible that you will operate your process in a way that is not covered under normal operations, you should have procedures for temporary operations. If you will simply shutdown your process (e.g., stop unloading the substance), you can ignore this item.

Emergency Shutdowns and Operations. These procedures cover the steps you need to take if you must shutdown your process quickly. For most Program 2 facilities, these procedures will be brief because shutting a process down will be little different in an emergency than in ordinary circumstances; you will simply shut off the flow or stop any unloading or loading. For warehouses, they may not apply. If you have a more complex process (e.g., one that operates under high pressure or temperature), you will need procedures to ensure that you can shutdown safely. Normally you gradually reduce flows, depressurize, and lower temperatures. If you need to do any of these quickly, you must have procedures that identify the steps workers should take to carry out these operations safely.

Normal Shutdown. These procedures apply mainly to facilities that process or use regulated substances. They may apply to you even if you only store a substance and you empty the tank for cleaning. These procedures probably will not apply to warehouses unless they repackage.

These procedures should provide all the steps needed to stop a process safely. For a complex process or one that operates under extreme conditions, shutdown may take considerable time and may be hazardous. The procedures should set out the time that should be taken and the checks that must be made before proceeding to the next steps.

Startup following a normal or emergency shutdown or a major change. These procedures may be similar to those for initial startup. Startup procedures following normal shutdown may include fewer equipment checks because you may not need to check equipment on a frequent basis. You should include all the steps your workers should take to ensure that the process can operate safely. Startup after an emergency shutdown will generally require more checks to ensure that valves that were closed are open and that they and other equipment are still functioning properly. These procedures will be limited if you only store a substance; they may not apply to warehouses in most instances.

Consequences of Deviations. Your operating procedures should tell the workers what will happen if something starts to go wrong. For example, if the pressure or temperature begins to rise or fall unexpectedly or the flow rate from one feed suddenly drops sharply, the operator must know (1) whether this poses a problem that must be

addressed, and (2) what steps to take to correct the problem or otherwise respond to it. Your safety information will have defined the safe operating limits for your substances and processes; the hazard review will have defined the possible consequences and the steps needed to prevent a deviation from causing serious problems. You should include this information in each of the other procedures (startup, normal operations, shutdowns), rather than as separate documents.

If your substance is one that has a distinctive odor, color, or other characteristic that operators will be able to sense, you should include in your procedures information about what to do if they notice leaks. Frequently, people are the most sensitive leak detectors. Take advantage of their abilities to catch leaks before they become serious.

Equipment Inspections. You should include steps for routine inspection of equipment by operators as part of your other procedures. These inspections cover the items that operators should look for on a daily basis to be sure that the equipment is running safely (e.g., vibration checks). These inspections are not the same as those detailed checks that maintenance workers will perform, but rather are the "eyeball," "sound," and "feel" tests that experienced operators do, often without realizing it. Your operators, your vendors, and your trade association can help you define the things that should trigger concern: When is a small leak at a seal normal; when is it a cause of concern? How much vibration is normal? What does a smoothly running motor sound like?

UPDATING PROCEDURES

You must update your procedures whenever you change your process in a way that alters the steps needed to operate safely. If you add new equipment, you will need to expand your procedures or develop a separate set to cover the new items. Whenever you change your safety information you should review your procedures to be sure that they are still appropriate. Anytime you conduct a hazard review, check your operating procedures as you implement changes to address hazards.

WHAT KIND OF DOCUMENTS DO I HAVE TO KEEP?

You must maintain your current set of operating procedures. You are not required to keep old versions; in fact, you should avoid doing so because keeping copies of outdated procedures may cause confusion. You should date all procedures so you will know when they were last updated.

WHERE TO GO FOR MORE INFORMATION

Although the reports below target the chemical industry, you may find useful information in them:

- *Guidelines for Process Safety Fundamentals for General Plant Operations*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1995.

- *Guidelines for Safe Process Operations and Maintenance*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1995

- *Guidelines for Writing Effective Operating and Maintenance Procedures*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1996.

6.5 TRAINING (§ 68.54)

Training programs often provide immediate benefits because trained workers have fewer accidents, damage less equipment, and improve operational efficiency. Training gives workers the information they need to understand how to operate safely and why safe operations are necessary. A training program, including refresher training, is the key to ensuring that the rest of your prevention program is effective. You already have some type of training program because you must conduct training to comply with OSHA's Hazard Communication Standard (29 CFR 1910.1200).

WHAT DO I NEED TO DO?

You must train all new workers in your operating procedures developed under the previous prevention program element; if any of your more experienced workers need training on these procedures, you should also train them. Any time the procedures are revised, you must train everyone using the new procedures. At least once every three years, you must provide refresher training on the operating procedures even if they have not changed. The training must cover all parts of the operating procedures, including information on the consequences of deviations and steps needed to address deviations.

For workers already operating a process, you may certify in writing that the employees have the "required knowledge, skills, and abilities to safely carry out the duties and responsibilities as provided in the operating procedures" (§ 68.54(a)). This "grandfather clause" means that you do not need to conduct additional training for workers you employed prior to June 21, 1999, who have the appropriate knowledge and skills to operate covered processes safely, in accordance with the operating procedures. This certification should be kept in your files; you do not need to submit it to EPA.

You are not required to provide a specific amount of training or type of training. You should develop a training approach that works for you. If you are a small facility, one-on-one training and on-the-job training may work best. Larger facilities may want to provide classroom training or video courses developed by vendors or trade associations before moving staff on to supervised work. You may have senior operators present the training or use trainers provided by vendors or other outside sources. The form and the length of the training will depend on your resources and your processes. If you can teach someone the basics in two hours and move them on to supervised work, that is all right. The important thing is that your workers understand how to operate safely and can carry out their tasks properly. We are interested in the results of the training, not the details of how you achieve them. Find

a system that works for you. Exhibit 6-8 lists things that you may find useful in developing your training program.

You are also required to ensure that each worker trained has understood the training and is competent to operate the process safely. You may decide what kind or kinds of competency testing to use. Observation by a senior operator may be appropriate in many cases. If you provided classroom training, you may want to use both testing and demonstration or observation. You are required to report in the RMP on the type(s) of competency testing you use.

EXHIBIT 6-8
TRAINING CHART

✔**Who needs training?**	Clearly identify the employees who need to be trained and the subjects to be covered.
✔**What are the objectives?**	Specify learning objectives, and write them in clear, measurable terms before training begins. Remember that training must address the process operating procedures.
✔**How will you meet the training objectives?**	Tailor the specific training modules or segments to the training objectives. Enhance learning by including hands-on training like using simulators whenever appropriate. Make the training environment as much like the working environment as you can, consistent with safety. Allow your employees to practice their skills and demonstrate what they know.
✔**Is your training program working?**	Evaluate your training program periodically to see if your employees have the skills and know the routines required under your operating procedures. Make sure that language or presentation are not barriers to learning. Decide how you will measure your employees' competence.
✔**How will your program work for new hires and refresher training?**	Make sure all workers – including maintenance and contract employees – receive initial and refresher training. If you make changes to process chemicals, equipment, or technology, make sure that involved workers understand the changes and the effects on their jobs.

HOW DOES THIS TRAINING FIT WITH OTHER REQUIRED TRAINING?

You are required by OSHA to provide training under the Hazard Communication Standard (29 CFR 1910.1200); this training covers the hazards of the chemicals and steps to take to prevent exposures. DOT has required training for loading and unloading of hazardous materials (49 CFR part 172, subpart H). Some of that training will cover items in your operating procedures. You do not need to repeat that training to meet EPA's requirements. You may want to integrate the training programs, but you do not have to do so.

WHAT KIND OF DOCUMENTATION DO I NEED TO KEEP?

In the RMP, you are required to report on the date of the most recent review or revision of your training program. You are also required to report on the type of

training required (e.g., classroom or on-the-job) and the type of competency testing used. You should keep on site any current training materials or schedules used. The rule does not require you to keep particular records of your training program. It is enough for you to have on site information that supports what is reported in the RMP and your implementation of the training program overall. You may want to keep an attendance log for any formal training courses and refresher training to ensure that everyone who needs to be trained is trained. Such logs will help you perform a compliance audit or demonstrate compliance with the rule although you are not required to keep logs for this rule.

WHERE TO GO FOR MORE INFORMATION

- *Guidelines for Process Safety Fundamentals for General Plant Operations*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1995.
- *Guidelines for Technical Planning for On-Site Emergencies*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1995.
- *Federally Mandated Training and Information* (Publication 12000), American Petroleum Institute.

6.6 MAINTENANCE (§ 68.56)

Preventive maintenance, inspection, and testing of equipment is critical to safe operations. Waiting for equipment to fail often means waiting for an accident that could harm people and the environment. Further, a thorough maintenance program will save you money by cutting down-time caused by equipment failures. Your hazard review and safety information will have identified equipment that is critical to safe operations. You should use that information to build your maintenance program.

WHAT DO I NEED TO DO?

You must prepare and implement procedures for maintaining the mechanical integrity of process equipment, and train your workers in the maintenance procedures. You may use procedures or instructions from equipment vendors, in Federal or state regulations, or in industry codes as the basis of your maintenance program. You should develop a schedule for inspecting and testing your equipment based on manufacturers' recommendations or your own experience if that suggests more frequent inspection or testing is warranted. Exhibit 6-9 briefly summarizes the elements of a maintenance program that would satisfy EPA's rule.

HOW DO I START?

Your first step will probably be to determine whether you already meet all these requirements. If you review your existing written procedures and determine that they are appropriate, you do not need to revise or rewrite them. If your workers are already trained in the procedures and carry them out, you may not need to do anything else.

If you do not have written procedures, you will need to develop them. Your equipment vendors may be able to provide procedures and maintenance schedules. Using these as the basis of your program is acceptable unless your use varies from that contemplated by the vendor or manufacturer (see below). Your trade association may also be able to help you with industry-specific checklists. If there are existing industry standards, your trade association can provide you with the references. Copies of these may form the basis for your maintenance program. If there are federal or state regulations that require certain maintenance, you should use these as well.

EXHIBIT 6-9
MAINTENANCE GUIDELINES

Written procedures	Training	Inspection & testing
✔You may use procedures provided by the vendor or trade association, etc., as the basis for your program. If you choose to develop your own, you must write them down.	✔Train process maintenance employees in process hazards and how to avoid or correct an unsafe condition. ✔Make sure this training covers the procedures applicable to safe job performance.	✔Inspect & test process equipment. ✔Use recognized and generally accepted good engineering practices. ✔Follow a schedule that matches the manufacturer's recommendations or that prior operating experience indicates is necessary.

You need to determine if procedures provided by vendors, manufacturers, trade associations, or others are appropriate for your operation. If your safety information indicates that you are operating in a standard way (e.g., using only parts designed for refrigeration service in your cold storage system), you may assume that these other procedures will work for you. If you are using equipment for purposes other than those for which it was designed, you need to decide whether your use changes the kinds of maintenance required.

TRAINING

Once you have written procedures, you must ensure that your maintenance workers are trained in the procedures and in the hazards of the process. As with the training discussed in the previous section, how you provide this training is up to you. We believe that you are in the best position to decide how to train your workers. Vendors may provide the training or videos; you may already provide training on hazards and how to avoid or correct them as part of Hazard Communication Standard training under OSHA regulations. You do not need to repeat this training to comply with this rule.

If you hire contractors to do your maintenance, you should ensure that they are trained to carry out the procedures. Under the rule, any maintenance contractor is required to ensure that each contract maintenance worker is trained to perform the maintenance procedures developed by the facility. You can help this process by providing training

or by developing agreements with the contractor that give you the assurance that only trained workers will be sent to your site. For any outside worker, you must ensure that they are informed of the hazards of your particular process. If you have standard equipment and hire contractors that specialize in servicing your types of processes, you can ensure their knowledge through agreements with the contractor.

INSPECTION AND TESTING

You must establish a schedule for inspecting and testing equipment associated with covered processes. The frequency of inspections and tests must be consistent with manufacturer's recommendations, industry standards or codes, good engineering practices, and your prior operating experience. In particular, you should use your own experience as a basis for examining any schedules recommended by others. Many things may affect whether a schedule is appropriate. The manufacturer may assume a constant rate of use (e.g., the amount of substance pumped per hour). If your use varies considerably, the variations may affect the wear on the equipment. Extreme weather conditions may also impact wear on equipment.

Talk with your operators as you prepare or adopt these procedures and schedules. If their experience indicates that equipment fails more frequently than the manufacturer expects, you should adjust the inspection schedule to reflect that experience. Your hazard review will have identified these potential problem areas as well and should be used as you develop schedules. For example, if you determine that corrosion is one of the hazards of the process, your schedule must address inspections for corrosion and replacement before failure. Your trade association may also be able to provide advice on these issues.

WHAT KIND OF DOCUMENTATION MUST I KEEP?

In the RMP, you are required to report on the date of the most recent review or revision of your maintenance procedures and the date of the most recent equipment inspection or test and equipment inspected or tested. You must keep on site your written procedures and schedules as well as any agreements you have with contractors. The rule does not require that you keep particular records of your maintenance program. It is enough for you to have on site information that supports what is reported in the RMP and your implementation of the maintenance program overall. For example, you may want to keep maintenance logs to keep track of when inspections and tests were done.

WHERE TO GO FOR MORE INFORMATION

Codes and Standards: The following groups develop codes and standards that may help you determine the appropriate frequency and methods to use for testing and inspection: National Board Inspection Code, the American Society for Testing and Material, American Petroleum Institute, National Fire Protection Association, American National Standards Institute, American Society of Mechanical Engineers.

Guidance and Reports. Although the reports below target the chemical industry, you may find useful information in them:

- *Guidelines for Equipment Reliability Data with Data Tables*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1989.

- *Guidelines for Process Safety Documentation*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1995.

- *Pressure Vessel Inspection Code: Maintenance Inspection, Rating, Repair, and Alteration* (API 510), American Petroleum Institute.

- *Tank Inspection, Repair, Alteration, and Reconstruction (Std 653)*, American Petroleum Institute.

Q & A
MAINTENANCE

Q. I have a propane tank for fuel use. I lease the tank from the propane supplier. The supplier does all the maintenance. My staff never work on the equipment. How I do meet this requirement?

A. As part of your contract with the supplier, you should gain an agreement, in writing, that the supplier will provide maintenance and trained maintenance workers that meet the requirements of 40 CFR 68.56.

6.7 COMPLIANCE AUDITS (§ 68.58)

Any risk management program should be reviewed periodically to ensure that employees and contractors are implementing it properly. A compliance audit is a way for you to evaluate and measure the effectiveness of your risk management program. An audit reviews each of the prevention program elements to ensure that they are up-to-date and are being implemented and will help you identify problem areas and take corrective actions. As a result, you'll be running a safer operation.

WHAT DO I NEED TO DO?

At least every three years, you must certify that you have evaluated compliance with for the prevention program requirements for each covered process. At least one person on your audit team must be knowledgeable about the covered process. You must develop a report of your findings, determine and document an appropriate response to each finding, and document that you have corrected any deficiency.

You must review compliance with each of the required elements of the prevention program. Because Program 2 processes are generally simple, the audit should not take a long time. You may want to develop a simple checklist; Exhibit 6-10 provides a sample format.

Once you have the checklist, you, your chief operator, or some other person who is knowledgeable about your process, singly or as a team, should walk through the facility and check on relevant items, writing down comments and recommendations.

For example, you may want to talk with employees to determine if they have been trained and are familiar with the procedures.

You must respond to each of the findings and document what actions, if any, you take to address problems. You should take steps to correct any deficiencies you find.

You may choose to have the audit conducted by a qualified outside party. For example, you may have someone from another part of your company do the audit or hire an expert in your process. If you do either of these, you should have an employee who works with or is responsible for the process accompany the auditor, both to understand the findings and answer questions.

Again, the purpose of the compliance audit is to ensure that you are continuing to implement the risk management program as required. Remember, the risk management program is an on-going process; it is not a set of documents that you develop and put on a shelf in case the government inspects your site. To be in compliance with (and gain the benefits of) the rule, procedures must be followed on a daily basis; documents must be kept up to date. The audit will check compliance with each prevention program element and indicate areas that need to be improved. You may choose to expand the scope to cover your compliance with other parts of the rule and the overall safety of your operation, but you are not required to do so.

WHAT KIND OF DOCUMENTATION MUST I KEEP?

You must keep a written record of audit findings and your response to those findings and documents that deficiencies have been corrected. You must keep the two most recent audit reports, but you need not keep a report that is more than five years old. You may also want to keep a record of who conducted the audit, but you are not required to do this.

WHERE TO GO FOR MORE INFORMATION

- Guidelines for Auditing Process Safety Management Systems, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1993.

Q & A
AUDITS

Q. Does the compliance audit requirement cover all of the Part 68 requirements or just the prevention program requirements?

A. The compliance audit requirement applies only to the prevention programs under Subpart C. If you have a Program 2 process, you must certify that you have evaluated compliance with the Program 2 prevention program provisions at least every three years to verify that the procedures and practices developed under the rule are adequate and are being followed. You may want to expand your audit to check other part 68 elements, but you are not required to do so.

EXHIBIT 6-10
SAMPLE AUDIT CHECKLIST
FOR SAFETY INFORMATION AND HAZARD REVIEW

Element	Yes/No/NA	Action/Completion Data
Safety Information		
MSDSs up-to-date?		
Maximum intended inventory determined?		
Determined Safe upper and lower temperature? Safe upper and lower pressures? Safe process flow rates? Compositions?		
Equipment specifications Tanks? Piping? Pressure relief valves? Emergency shutoff valves? Gauges? Pumps? Compressors? Hoses?		
Hazard Review		
Has equipment been inspected to determine if it is designed, manufactured, installed, and operated according to industry standards and codes?		
Are the results of the inspections documented?		
Have inspections been conducted after every major change?		

6.8 INCIDENT INVESTIGATION (§ 68.60)

Incidents can provide valuable information about site hazards and the steps you need to take to prevent accidental releases. Often, the immediate cause of an incident is the result of a series of other problems that need to be addressed to prevent recurrences. For example, an operator's mistake may be the result of poor training. Equipment failure may result from improper maintenance or misuse. Without a thorough investigation, you may miss the opportunity to identify and solve these problems.

WHAT DO I NEED TO DO?

You must investigate each incident which resulted in, or could have resulted in, a catastrophic release of a regulated substance. A catastrophic release is one that presents an imminent and substantial endangerment to public health and the environment. Exhibit 6-11 briefly summarizes the steps you must take for investigating incidents. You should also consider investigating minor accidents or near misses because they may help you identify problems that could lead to more serious accidents; however, you are not required to do so under part 68.

EXHIBIT 6-11
INCIDENT INVESTIGATION REQUIREMENTS

✔**Initiate an investigation promptly**.	Begin investigating no later than 48 hours following the incident.
✔**Summarize the investigation in a report.**	Among other things, the report must identify the factors contributing to the incident. Remember that identifying the root cause may be more important than identifying the initiating event. The report must also include any recommendations for corrective actions. Remember that the purpose of the report is to help management take corrective action.
✔**Address the report's findings and recommendations.**	Establish a system to address promptly and resolve the incident report findings and recommendations and document resolutions and corrective actions.
✔**Review the report with your staff and contractors.**	You must share the report - its findings and recommendations - with affected workers whose job tasks are relevant to the incident.
✔**Retain the report.**	Keep incident investigation summaries for five years.

HOW DO I START?

You should start with a simple set of procedures that you will use to begin an investigation. You may want to assign someone to be responsible for compiling the initial incident data and putting together the investigation team. If you have a small facility, your "team" may be one person who works with the local responders, if they were involved.

The purpose of the investigation is to find out what went wrong and why, so you can prevent it from happening again. Do not stop at the obvious failure or "initiating event" (e.g., the hose was clogged, the operator forgot to check the connection); try to determine why the failure occurred. In many cases, the underlying cause will be what matters (e.g., the operator did not check the connection because the operating procedures and training did not include this step). If the accident occurred because of

operator error, you should determine if the operator made the mistake because he or she had been trained inadequately or trained in the wrong procedures or because design flaws made mistakes likely. If you write off the accident as operator error alone, you miss the chance to take the steps needed to prevent such errors the next time. Similarly, if equipment fails, you should try to decide whether it had been used or maintained improperly.

Remember, your goals are to prevent accidents, not to blame someone, and correct any problems in your prevention program. In this way, you can prevent recurrences.

In some cases, an investigation will not take long. In other cases, if you have a complex facility, equipment has been severely damaged, or the workers seriously hurt, an investigation may take several days. You should talk with the operators who were in the area at the time and check records on maintenance (another reason for keeping logs). If equipment has failed in an unusual way, you may need to talk to the manufacturer and your trade association to determine if similar equipment has suffered similar failures.

You must develop a summary of the accident and its causes and make recommendations to prevent recurrences. You must address each recommendation and document the resolution and any actions taken. Finally, you must review the findings with operators affected by the findings.

WHAT KIND OF DOCUMENTATION MUST I KEEP?

You must maintain the summary of the accident investigation and recommendations and document resolutions and corrective actions. A sample format is shown in Exhibit 6-12 that combines all of these in a single form. Note that the form also includes accident data that you will need for the five-year accident history. These data are not necessarily part of the incident investigation report, but including them will create a record you can use later to create the accident history.

WHERE TO GO FOR MORE INFORMATION

Although the reports below target the chemical industry, you may find useful information in them:

- *Guidelines for Investigating Chemical Process Incidents*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1992.
- *Guide for Fire and Explosion Investigations* (NFPA 921), National Fire Protection Association.

EXHIBIT 6-12
SAMPLE INCIDENT INVESTIGATION FORMAT

Ammonia Tank Release		
Date: May 15, 1998; 3 pm	Substance: Ammonia	Quantity: 2 tons
Duration: 2 hours	Weather: 82 F, 8 mph winds	Date Investigation Started: May 16, 1998
Description:	Unloading hose split open and spilled substance; operator was in the main building and failed to notice spill for several minutes	
Findings	**Recommendations**	**Actions**
Hose split because the pressure was too great	Replace hose with higher pressure hose Revise procedures for checking on pressure	Replaced hose as recommended; revised procedures; conducted training on new procedures
Operator failed to stay at the tank during loading	Conduct refresher training to stress necessity of remaining at the tank during loading	Refresher training provided; safety meetings added and held on a monthly basis to review safety issues
Tank required manual shutoff	Determine if automatic shutoff valve is feasible	Automatic shutoff valve installed

6.9 CONCLUSION

Many of you will need to do little that's new to comply with the Program 2 prevention program, because complying with other Federal rules, state requirements, and industry-specific codes and standards results in compliance with many Program 2 elements. And if you've voluntarily implemented OSHA's PSM standard for your Program 2 process, you'll meet the lesser Program 2 prevention program requirements. No matter what choices you make in complying with the Program 2 prevention program, keep these things in mind:

- Integrate the elements of your prevention program. For Program 2 owners and operators, a major change in any single element of your program should lead to a review of other elements to identify any effect caused by the change.

- Make accident prevention an institution at your site. Like the entire risk management program, a prevention program is more than a collection of written documents. It is a way to make safe operations and accident prevention the way you do business everyday.

- Check your operations on a continuing basis and ask if you can improve them to make them safer as well as more efficient.

CHAPTER 7: PREVENTION PROGRAM (PROGRAM 3)

Many of you will need to do little that is new to comply with the Program 3 prevention program, because you already have the OSHA PSM program in place. Whether you're building on the PSM standard or creating a new program, keep these things in mind.

- EPA and OSHA have different legal authority — EPA for offsite consequences, OSHA for on-site consequences. If you are already complying with the PSM standard, your process hazard analysis (PHA) team may have to assess new hazards that could affect the public or the environment offsite. Protection measures that are suitable for workers (e.g., venting releases to the outdoors) may be the very kind of thing that imperils the public.

- Integrate the elements of your prevention program. You must ensure that a change in any single element of your program leads to a review of other elements to identify any effect caused by the change.

- Most importantly, make accident prevention an institution at your site. Like the entire risk management program, a prevention program is more than a collection of written documents. It is a way to make safe operations and accident prevention the way you do business everyday.

7.1 PROGRAM 3 PREVENTION PROGRAM AND OSHA PSM

The Program 3 prevention program includes the requirements of the OSHA PSM standard. Whenever we could, EPA used OSHA's language verbatim. However, there were a few terms that EPA had to change to reflect the differences between its authority and OSHA's. For example, OSHA regulates to protect workers; EPA's responsibility is to protect public health and safety and the environment. Therefore, an "owner or operator" subject to EPA's rule must investigate catastrophic releases "that present(s) (an) imminent and substantial endangerment to public health and the environment," but an OSHA "employer" would focus its concerns on the workplace. To clarify these distinctions, we deleted specific references to workplace impacts and "safety and health" contained in OSHA's PSM standards. We also used different schedule dates and references where appropriate. Exhibit 7-1 compares terms in EPA's rule with their counterparts in the OSHA PSM standard.

EXHIBIT 7-1
COMPARABLE EPA AND OSHA TERMS

OSHA TERM	EPA TERM
Highly hazardous substance	Regulated substance
Employer	Owner or operator
Facility	Stationary source
Standard	Rule or part

There are twelve elements in the Program 3 prevention program. Each element corresponds with a section of subpart D of part 68. Exhibit 7-2 sets out each of the

twelve elements, the corresponding section numbers, and OSHA references. Two OSHA elements are not included. Emergency response is dealt with separately in part 68; the OSHA trade secrets requirement (provision of trade secret information to employees) is beyond EPA's statutory authority.

EXHIBIT 7-2
SUMMARY OF PROGRAM 3 PREVENTION PROGRAM
(40 CFR PART 68, SUBPART D)

SECTION	TITLE	OSHA PSM REFERENCE
§ 68.65	Process Safety Information	PSM standard § 1910.119(d).
§ 68.67	Process Hazard Analysis (PHA)	PSM standard § 1910.119(e).
§ 68.69	Operating Procedures	PSM standard § 1910.119(f).
§ 68.71	Training	PSM standard § 1910.119(g).
§ 68.73	Mechanical Integrity	PSM standard § 1910.119(j).
§ 68.75	Management of Change	PSM standard § 1910.119(l).
§ 68.77	Pre-Startup Review	PSM standard § 1910.119(I).
§ 68.79	Compliance Audits	PSM standard § 1910.119(o).
§ 68.81	Incident Investigation	PSM standard § 1910.119(m)
§ 68.83	Employee Participation	PSM standard § 1910.119(c).
§ 68.85	Hot Work Permit	PSM standard § 1910.119(k).
§ 68.87	Contractors	PSM standard § 1910.119(h).

OSHA provided guidance on PSM in non-mandatory appendix C to the standard. OSHA has reprinted this appendix as PSM Guidelines for Compliance (OSHA 3133). The OSHA guidance is reproduced, reordered to track part 68, in Appendix F. The remainder of this chapter briefly outlines the major requirements and provides a discussion of any differences between EPA and OSHA. In some cases, further guidance is provided on the meaning of specific terms. For more detailed guidance, you should refer to the OSHA guidance in Appendix F.

QS &AS
IMPLEMENTATION AND PROGRAM LEVEL

Q. My process is a series of storage and process vessels, connected by piping, containing several regulated substances, with a few co-located tanks of other substances. Do I have to implement one prevention program to cover all aspects of the process even if different operators, different process chemistry, and different hazards are involved in various parts of the process?

A. You should implement the program in the way that makes sense to you. For a complex process such as yours, you may need to divide the process into sections (e.g., production units for particular products, storage units) for the PHA and compliance audits, to keep the analyses manageable. Operating and maintenance procedures (and the training in these procedures) should be developed for operating units; combining procedures for different types of units into a single document may make them harder to use; training operators in procedures they do not need would waste time and perhaps confuse operators. You may want to collect and store process safety information by individual units to make it easier to use. Other parts of the program (contractors, employee participation, procedures for pre-startup, management of change, and hot work) are likely to be common to all parts of the process.

Q. I have a tank with more than 10,000 pounds of propane. I use the propane to heat the offices, but not as a fuel for my covered process, so it is not subject to OSHA PSM and would be Program 2 for EPA. The tank, however, is close to equipment that has chlorine above the applicable threshold and is subject to OSHA PSM and Program 3. Is the tank considered part of the process? Does this affect the program level?

A. If a fire or explosion in the propane tank could cause a release of chlorine or other regulated substances or interfere with mitigation of such a release, the tank is considered part of a single process and consequently is subject to both OSHA PSM and Program 3.

7.2 PROCESS SAFETY INFORMATION (§68.65)

Exhibit 7-3 briefly summarizes the process safety information requirements.

EXHIBIT 7-3
PROCESS SAFETY INFORMATION REQUIREMENTS

For chemicals, you must complete information on:	For process technology, you must provide:	For equipment in the process, you must include information on:
✔Toxicity ✔Permissible exposure limits ✔Physical data ✔Reactivity ✔Corrosivity ✔Thermal & chemical stability ✔Hazardous effects of inadvertent mixing of materials that could foreseeably occur	✔A block flow diagram or simplified process flow diagram ✔Information on process chemistry ✔Maximum intended inventory of the EPA-regulated chemical ✔Safe upper & lower limits for such items as temperature, pressure, flows, or composition ✔An evaluation of the consequences of deviation	✔Materials of construction ✔Piping & instrument diagrams (P&IDs) ✔Electrical classification ✔Relief system design & design basis ✔Ventilation system design ✔Design codes & standards employed ✔Safety systems ✔Material and energy balances for processes built after June 21, 1999

WHERE TO GO FOR MORE INFORMATION

Diagrams. You may find it useful to consult Appendix B of OSHA's PSM final rule, computer software programs that do P&IDs, or other diagrams.

Guidance and Reports. Various engineering societies issue technical reports relating to process design. Other sources you may find useful include:

- *Guidelines for Process Safety Documentation*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1995.
- *Emergency Relief System Design Using DIERS Technology*, American Institute of Chemical Engineers, 1992.
- *Emergency Relief Systems for Runaway Chemical Reactions and Storage Vessels: A Summary of Multiphase Flow Methods*, American Institute of Chemical Engineers, 1986.
- *Guidelines for Pressure Relief and Emergency Handling Systems*, Center for Chemical Process Safety of the American Institute of Chemical Engineers, 1998.
- *Loss Prevention in the Process Industries*, Volumes I, II, and III, Frank P. Lees, Butterworths: London 1996.

Qs & As
Process Safety Information

Q. What does "materials of construction" apply to and how do I find this information?

A. You must document the materials of construction for all process equipment in a covered process. For example, you need to know the materials of construction for process vessels, storage vessels, piping, hoses, valves, and flanges. Equipment specifications should provide this information.

Q. What does "electrical classification" mean?

A. Equipment and wiring for locations where fire and explosion hazards may exist must meet requirements based on the hazards. Each room, section, or area must be considered separately. Equipment should be marked to show Class, Group, and operating temperature or temperature range. You must determine the appropriate classification for each area and ensure that the equipment used is suitable for that classification. The equipment covered includes transformers, capacitors, motors, instruments, relays, wiring, switches, fuses, generators, lighting, alarms, remote controls, communication, and grounding. Electrical classification will be included in equipment specifications.

Q. What does "relief system design basis" mean?

A. Relief systems include, but are not limited to, relief valves, relief headers, relief drums, and rupture disks. Design basis means documenting how the loads and sizes of the relief system, as well as inlet and outlet sizes, were determined. This includes a description of overpressure scenarios considered, the scenario that creates the largest load to be relieved, the assumptions used, and if the device meets a certain code. Relief devices on pressure vessels must conform to ASME codes. Industry codes (e.g., API RP 520) also provide guidance on scenarios that should be considered and on equations for sizing of devices. Scenarios you may need to consider include fire, blocked flow, control valve failure, overheating, power outage, tube rupture, and cooling water failure. For two-phase flow, you should review AIChE publications from the Design Institute for Emergency Relief Systems (DIERS).

Q. What do I have to do for material and energy balances?

A. For new processes, you must document both material and energy inputs and outputs of a process. For example, you would document the quantity of a regulated substance added to the process, the quantity consumed during the process, and the quantity that remains in the output. This requirement will not generally apply to storage processes.

7.3 PROCESS HAZARD ANALYSIS (§68.67)

Exhibit 7-4 provides a summary of the requirements for process hazard analyses (PHAs).

EXHIBIT 7-4
PROCESS HAZARD ANALYSIS REQUIREMENTS

The PHA must cover::	**Techniques must be one or more of:**	**Other requirements:**
✔Hazards of the process ✔Identification of previous, potentially catastrophic incidents ✔Engineering and administrative controls applicable to the hazards ✔Consequence of failure of controls ✔Siting ✔Human factors ✔Qualitative evaluation of health and safety impacts of control failure	✔What If ✔Checklist ✔What If/Checklist ✔Hazard and Operability Study (HAZOP) ✔Failure Mode and Effects Analysis (FMEA) ✔Fault Tree Analysis ✔Appropriate equivalent methodology	✔Analysis must be done by a team, one member of which has experience in the process, one member of which is knowledgeable in the PHA technique ✔A system must be developed for addressing the team's recommendations and documenting resolution and corrective actions taken ✔The PHA must be updated at least once every five years ✔PHAs and documentation of actions must be kept for the life of the process

EPA/OSHA DIFFERENCES

You can use a PHA conducted under the OSHA PSM standard as your initial process hazard analysis. All OSHA PHAs must have been completed by May 1997. Therefore, the only "new" PHAs will be for non-OSHA Program 3 processes. If the process is subject to OSHA PSM, you can update and revalidate your PHA on OSHA's schedule.

Offsite impacts. You should consider offsite impacts when you conduct a PHA under EPA's rule (except for an initial PHA where are using the PHA conducted for OSHA PSM). If you are in the Program 3 prevention program because you must comply with the PSM standard, you may not have fully considered offsite consequence because the focus of PSM is worker protection. Practically speaking, however, there should be few instances where the scenarios considered for OSHA fail to address offsite impacts. A well-done PHA should identify all failure scenarios that could lead to significant exposure of workers, the public, or the environment. The only issue that may require further consideration for part 68 processes is whether any protection measures that were adequate for worker safety are inadequate for public and environmental safety.

Consider two circumstances — one where OSHA's PSM standard and EPA's risk management program rule lead to the same result, and another where protecting workers could mean endangering the public and the environment. For flammables, any scenario that could affect the public almost certainly would have the potential to affect workers; measures taken to protect your employees likely will protect the public and the environment. For toxics under PSM, however, you may plan to address a loss of containment by venting toxic vapors to the outside air. In each circumstance, a PHA should define how the loss of containment could occur. However, for EPA, the PHA team should reassess venting as an appropriate mitigation measure.

Updating and revalidating your PHA. For EPA, you must complete the initial PHA for each Program 3 process not later than June 21, 1999, and update it at least once every five years. You may complete an initial PHA before that date. You may use an OSHA PHA as your initial PHA, and update and revalidate it every five years on the OSHA schedule. A PHA completed after August 19, 1996 (the effective date of part 68) should consider offsite impacts.

REJECTING TEAM RECOMMENDATIONS

You may not always agree with your PHA team's recommendations and may wish to reject a recommendation. OSHA's compliance directive CPL 2-2.45A-revised states that you may decline a team recommendation if you can document one of the following: (1) the analysis upon which the recommendation is based contains factual errors; (2) the recommendation is not necessary to protect the health of employees or contractors; (3) an alternative measure would provide a sufficient level of protection; or (4) the recommendation is infeasible. For part 68, you should also consider whether recommendations are not necessary to protect public health and the environment.

UPDATING YOUR PHA

You should update or revalidate your PHA whenever there is a new hazard or risk created by changes to your process. Such changes might include introducing a new process, process equipment, or regulated substance; altering process chemistry that results in any change to safe operating limits; or other alteration that introduces a new hazard. You might, for example, introduce a new hazard if you installed a gas pipeline next to a storage tank containing a regulated substance. Other candidates could be making changes in process constituents that increase the possibility of runaway reactions or polymerization. EPA recommends that you consider revalidating your PHA whenever adjoining processes create a hazard. Remember that you have a general duty to prevent accidents and ensure safety at your source, which may require you to take steps beyond those specified in the risk management program rule.

WHERE TO GO FOR MORE INFORMATION

Appendix 7-A of this chapter provides a summary of each of the techniques, a description of the types of processes for which they may be appropriate, and estimates about the time and staff required for each.

Part 68 and OSHA PSM require that whichever technique or techniques you use, you must have at least one person on the PHA team who is trained in the use of the technique. Training on such techniques is available from a number of professional organizations as well as private companies. You may have staff members who are capable of providing this training as well. Many trade associations publish detailed guidance on methods for conducting a process hazard analysis. You might find the following documents useful.

- *Guidelines for Hazard Evaluation Procedures, 2nd Ed. with Worked examples,* Center for Chemical Process Safety of the American Institute of Chemical Engineers 1992.
- *Evaluating Process Safety in the Chemical Industry*, Chemical Manufacturers Association.
- *Loss Prevention in the Process Industries, Volumes I, II, and III*, Frank P. Lees, Butterworths: London 1996.
- *Management of Process Hazards (RP 750),* American Petroleum Institute.
- *Risk-Based Decision Making (Publication 16288),* American Petroleum Institute.

QS & AS
OFFSITE CONSEQUENCES

Q. What does EPA mean by "consider offsite consequences"? Do we have to do an environmental impact assessment (EIA)?

A. EPA does not expect you to do an EIA. Potential consequences to the public and the environment are already analyzed in the offsite consequence analysis. In the PHA, EPA only expects you to identify any failure scenarios that could lead to public exposures and to examine whether your strategies are adequate to reduce the risk of such exposures.

Q. If I need to revise a PHA to consider offsite consequences, when do I have to do that?

A. In general, for a PHA completed to meet the requirements of OSHA PSM, you should revise the PHA to consider offsite consequences when you update that PHA. Any PHA for a covered process completed or updated for OSHA PSM after August 19, 1996, when part 68 was effective, should examine offsite consequences. For example, if you completed an initial PHA for OSHA PSM in May 1993, OSHA requires that you update that PHA by May 1998. In that update, you should consider offsite consequences. If you complete your initial PHA for OSHA in May 1995, you must update it by May 2000; PHAs conducted for part 68 must include consideration of offsite consequences at that time.

7.4 OPERATING PROCEDURES (§68.69)

Exhibit 7-5 summarizes what your operating procedures must address. Operating procedures must be readily accessible to workers who operate or maintain the process. You must review operating procedures as often as necessary to assure that they reflect current practices and any changes to the process or facility. You must certify annually that the operating procedures are current and accurate.

EXHIBIT 7-5
OPERATING PROCEDURES REQUIREMENTS

Steps for each operating phase	**Operating limits**	**Safety & health considerations**	**Safety systems & their functions**
✔Initial startup ✔Normal operations ✔Temporary operations ✔Emergency shutdown ✔Emergency operations ✔ Normal shutdown ✔Startup following a turnaround or emergency shutdown ✔Lockout/tagout ✔Confined space entry ✔Opening process equipment or piping ✔Entrance into the facility	✔Consequences of deviations ✔Steps to avoid, correct deviations	✔Chemical properties & hazards ✔Precautions for preventing chemical exposure ✔Control measures for exposure ✔QC for raw materials and chemical inventory ✔Special or unique hazards	✔Address whatever is applicable

WHERE TO GO FOR MORE INFORMATION

Chapter 7 of this document provides descriptions of each operating phase and when these phases may not apply to certain operations.

- *Guidelines for Process Safety Fundamentals for General Plant Operations*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1995.
- *Guidelines for Safe Process Operations and Maintenance*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1995.
- *Guidelines for Writing Effective Operating and Maintenance Procedures*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1996.

7.5 TRAINING (§68.71)

You are required to train new operators on the operating procedures and cover health and safety hazards, emergency operations, and safe work practices applicable to the

employee's tasks. For workers involved in operating the process before June 21, 1999, you may certify in writing that they are competent to operate the process safely, in accordance with the operating procedures. At least every three years you must provide refresher training (you must consult with employees involved in operating the process to determine the appropriate frequency). Finally, you are required to determine that each operator has received and understood the training and keep a record for each employee with the date of the training and the method used to verify that the employee understood the training.

WHERE TO GO FOR MORE INFORMATION

- *Guidelines for Process Safety Fundamentals for General Plant Operations*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1995.
- *Guidelines for Technical Planning for On-Site Emergencies*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1995.
- *Federally Mandated Training and Information (Publication 12000)*, American Petroleum Institute.

7.6 MECHANICAL INTEGRITY (§68.73)

You must have a mechanical integrity program for pressure vessels and storage tanks, piping systems, relief and vent systems and devices, emergency shutdown systems, controls, and pumps. Exhibit 7-6 briefly summarizes the other requirements for your mechanical integrity program.

WHERE TO GO FOR MORE INFORMATION

Guidance and Reports. Other sources of guidance and reports you may find useful include:

- *Guidelines for Process Equipment Reliability Data with Data Tables*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1989.
- *Guidelines for Process Safety Documentation*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1995.
- *Pressure Vessel Inspection Code: Maintenance Inspection, Rating, Repair, and Alteration (API 510)*, American Petroleum Institute.
- *Tank Inspection, Repair, Alteration, and Reconstruction (Std 653)*, American Petroleum Institute.

7.7 MANAGEMENT OF CHANGE (§68.75)

Exhibits 7-7 briefly summarizes EPA's MOC requirements.

EXHIBIT 7-6
MECHANICAL INTEGRITY CHART

Written procedures	**Training**	**Inspection & testing**	**Equipment deficiencies**	**Quality assurance**
✔Establish & implement written procedures to maintain the integrity of process equipment.	✔Train process maintenance employees in an overview of the process and its hazards. ✔Make sure this training covers the procedures applicable to safe job performance.	✔Inspect & test process equipment. ✔Use recognized and generally accepted good engineering practices. ✔Follow a schedule that matches the manufacturer's recommendations or more frequently if prior operating experience indicates is necessary. ✔Document each inspection & test with: Date, inspector name, equipment identifier, test or inspection performed, results.	✔Correct equipment deficiencies before further use of process equipment or whenever necessary to ensure safety.	✔Establish a QA program for new construction & equipment, newly installed equipment, maintenance materials, and spare parts & equipment.

EXHIBIT 7-7
MANAGEMENT OF CHANGE REQUIREMENTS

MOC procedures must address:	**Employees affected by the change must:**	**Update process safety information if:**	**Update operating procedures if:**
✔Technical basis for the change ✔Impact on safety and health ✔Modifications to operating procedures ✔Necessary time period for the change ✔ Authorization requirements for proposed change	✔Be informed of the change before startup ✔Trained in the change before startup	✔A change covered by MOC procedures results in a change in any PSI required under EPA's rule (see § 67.65)	✔A change covered by MOC procedures results in a change in any operating procedure required under EPA's rule (see § 67.69)

WHERE TO GO FOR MORE INFORMATION

- *Management of Change in Chemical Plants: Learning from Case Histories*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1993.
- *Plant Guidelines for Technical Management of Chemical Process Safety*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1992.
- *Management of Process Hazards (RP 750)*, American Petroleum Institute.

7.8 PRE-STARTUP REVIEW (§68.77)

You must conduct your pre-startup safety review for new stationary sources or modified stationary sources when the modification is significant enough to require a change in safety information under the management of change element. You must conduct your pre-startup review before you introduce a regulated substance to a process, and you must address the items listed in Exhibit 7-8.

EXHIBIT 7-8
PRE-STARTUP REVIEW REQUIREMENTS

Design Specifications	Adequate Procedures	PHA/MOC	Training
✔Confirm that new or modified construction and equipment meet design specifications.	✔Ensure that procedures for safety, operating, maintenance, and emergencies are adequate and in place.	Perform a PHA and resolve or implement any recommendations for new process. Meet management of change requirements for modified process.	✔Confirm that each employee involved in the process has been trained completely.

7.9 COMPLIANCE AUDITS (§68.79)

You must conduct an audit of the process to evaluate compliance with the prevention program requirements at least once every three years. At least one person involved in the audit must be knowledgeable in the process. You must develop a report of the findings and document appropriate responses to each finding and document that deficiencies have been addressed. The two most recent audit reports must be kept on-site.

WHERE TO GO FOR MORE INFORMATION

- *Guidelines for Auditing Process Safety Management Systems*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1993.

7.10 INCIDENT INVESTIGATION (§68.81)

Exhibit 7-9 briefly summarizes the steps you must take for investigating incidents.

EXHIBIT 7-9
INCIDENT INVESTIGATION REQUIREMENTS

✔Initiate an investigation promptly.	Begin investigating no later than 48 hours following the incident.
✔Establish a knowledgeable investigation team.	Establish an investigation team to gather the facts, analyze the event, and develop the how and why of what went wrong. At least one team member must have knowledge of the process involved. Consider adding other workers in the process area where the incident occurred. Their knowledge will be significant and should give you the fullest insight into the incident.
✔Summarize the investigation in a report.	Among other things, the report must identify the factors contributing to the incident. Remember that identifying the root cause may be more important than identifying the initiating event. The report must also include any recommendations for corrective actions. Remember that the purpose of the report is to help management take corrective action.
✔Address the team's findings and recommendations.	Establish a system to address promptly and resolve the incident report findings and recommendations; document resolutions and corrective actions.
✔Review the report with your staff and contractors.	You must share the report - its findings and recommendations - with affected workers whose job tasks are relevant to the incident.
✔Retain the report.	Keep incident investigation reports for five years.

You must investigate each incident which resulted in, or could have resulted in, a "catastrophic release of a regulated substance." A catastrophic release is one that "presents an imminent and substantial endangerment to public health and the environment." Although the rule requires you to investigate only those incidents which resulted in, or could reasonably have resulted in a catastrophic release, EPA encourages you to investigate all accidental releases. Investigating minor accidents or near misses can help you identify problems that could result in major releases if left unaddressed.

WHERE TO GO FOR MORE INFORMATION

- *Guidelines for Investigating Chemical Process Incidents*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1992.
- *Guide for Fire and Explosion Investigations (NFPA 921)*, National Fire Protection Association.

7.11 EMPLOYEE PARTICIPATION (§68.83)

Exhibit 7-10 briefly summarizes what you must do.

EXHIBIT 7-10
EMPLOYEE PARTICIPATION REQUIREMENTS

✔Write a plan.	Develop a written plan of action regarding how you will implement employee participation.
✔Consult with employees.	Consult your employees and their representatives regarding conducting and developing PHAs and other elements of process safety management in the risk management program rule.
✔Provide access to information.	Ensure that your employees and their representatives have access to PHAs and all other information required to be developed under the rule.

7.12 HOT WORK PERMITS (§68.85)

Exhibit 7-11 briefly summarizes how to meet the hot work permit requirement.

EXHIBIT 7-11
HOT WORK PERMITS REQUIREMENTS

✔Issue a hot work permit.	You must issue this permit for hot work conducted on or near a covered process.
✔Implement fire prevention and protection.	You must ensure that the fire prevention and protection requirements in 29 CFR 1910.252(a) are implemented before the hot work begins. The permit must document this.
✔Indicate the appropriate dates.	The permit should indicate the dates authorized for hot work.
✔Identify the work.	The permit must identify the object on which hot work is to be performed.
✔Maintain the permit on file.	You must keep the permit on file until workers have completed the hot work operations.

WHERE TO GO FOR MORE INFORMATION

- *Standard for Fire Prevention in Use of Cutting and Welding Processes (NFPA 518)*, National Fire Protection Association.
- *Standard for Welding*, Cutting and Brazing, 29 CFR 1910 Subpart Q.

7.13 CONTRACTORS (§68.87)

Exhibit 7-12 summarizes both yours and the contractors' responsibilities where contractors perform maintenance or repair, turnaround, major renovation, or specialty work on or adjacent to a covered process.

EXHIBIT 7-12
CONTRACTORS CHART

You must...	Your contractor must...
✔**Check safety performance.** When selecting a contractor, you must obtain and evaluate information regarding the safety performance of the contractor.	✔**Ensure training for its employees.** The contractor must train its employees to ensure that they perform their jobs safely and in accordance with your source's safety procedures.
✔**Provide safety and hazards information.** You must inform the contractor of potential fire, explosion, or toxic release hazards; and of your emergency response activities as they relate to the contractor's work and the process.	✔**Ensure its employees know process hazards and applicable emergency actions.** The contractor must assure that contract employees are aware of hazards and emergency procedures relating to the employees' work.
✔**Ensure safe practices.** You must ensure that you have safe work practices to control the entrance, presence, and exit of contract employees in covered process areas.	✔**Document training.** The contractor must prepare a record documenting and verifying adequate employee training.
✔**Verify that the contractor acts responsibly.** You must verify that the contractor is fulfilling its responsibilities.	✔**Ensure its employees are following your safety procedures.**
	✔**Inform you of hazards.** The contractor must tell you of any unique hazards presented by its work or of any hazards it finds during performance.

EPA/OSHA DIFFERENCES

EPA has no authority to require that you maintain an occupational injury and illness log for contract employees. Be aware, however, that OSHA does have this authority, and that the PSM standard does set this requirement. (See 29 CFR 1910.119(h)(2)(vi)).

WHERE TO GO FOR MORE INFORMATION

- *Contractor and Client Relations to Assure Process Safety*, Center for Chemical Process Safety of the American Institute of Chemical Engineers 1996.
- *API/CMA Managers Guide to Implementing a Contractor Safety Program (RP 2221)*, American Petroleum Institute.
- *Improving Owner and Contractor Safety Performance (RP 2220)*, American Petroleum Institute.

APPENDIX 7-A
PHA TECHNIQUES

This appendix provides descriptions of each of the PHA techniques listed in the OSHA PSM standard and § 68.67. These descriptions include information on what each technique is, which types of processes they may be appropriate for, what their limitations are, and what level of effort is typically associated with each. This information is based on *Guidelines for Hazard Evaluation Procedures*, 2nd Ed., published by AIChE/CCPS. If you are interested in more detailed discussion and worked examples, you should refer to the AIChE/CCPS volume.

Neither the information below nor the full AIChE/CCPS volume will provide you with enough information to conduct a PHA. The rule requires that your PHA team include at least one person trained in the technique you use. Training in PHA techniques is available from a number of organizations. If you must conduct multiple PHAs, you are likely to need to update your PHAs frequently, or you have a complex process that will take several weeks to analyze, you may want to consider training one or more of your employees. If you have a single process that is unlikely to change more than once every five years, you may find it more cost-effective to hire a trained PHA leader.

DESCRIPTIONS OF TECHNIQUES

CHECKLISTS

Checklists are primarily used for processes that are covered by standards, codes, and industry practices — for example, storage tanks designed to ASME standards, ammonia handling covered by OSHA (29 CFR 1910.111), propane facilities subject to NFPA-58. Checklists are easy to use and can help familiarize new staff with the process equipment. AIChE/CCPS states that checklists are a highly cost-effective way to identify customarily recognized hazards. Checklists are dependent on the experience of the people who develop them; if the checklist is not complete, the analysis may not identify hazardous situations.

Checklists are created by taking the applicable standards and practices and using them to generate a list of questions that seek to identify any differences or deficiencies. If a checklist for a process does not exist, an experienced person must develop one based on standards, practices, and facility or equipment experience. A completed checklist usually provides "yes," "no," "not applicable," and "need more information" answers to each item. A checklist analysis involves touring the process area and comparing equipment to the list.

AIChE/CCPS estimates that for a small or simple system a checklist will take 2 to 4 hours to prepare, 4 to 8 hours to evaluate the process, and 4 to 8 hours to document the results. For larger or more complex processes, a checklist will take 1 to 3 days to prepare, 3 to 5 days to evaluate, and 2 to 4 days to document.

WHAT-IF

A What-If is a brainstorming approach in which a group of people familiar with the process ask questions about possible deviations or failures. These questions may be framed as What-If, as in "What if the pump fails?" or may be expressions of more general concern, as in "I worry about contamination during unloading." A scribe or recorder takes down all of the questions on flip charts or a computer. The

questions are then divided into specific areas of investigation, usually related to consequences of interest. Each area is then addressed by one or more team members.

What-If analyses are intended to identify hazards, hazardous situations, or accident scenarios. The team of experienced people identifies accident scenarios, consequences, and existing safeguards, then suggest possible risk reduction alternatives. The method can be used to examine deviations from design, construction, modification, or operating intent. It requires a basic understanding of the process and an ability to combine possible deviations from design intent with outcomes. AIChE describes this as a powerful procedure if the staff are experienced; "otherwise, the results are likely to be incomplete."

A What-If usually reviews the entire process, from the introduction of the chemicals to the end. The analysis may focus on particular consequences of concern. AIChE provides the following example of a What-If question: "What if the raw material is the wrong concentration?" The team would then try to determine how the process would respond: "If the concentration of acid were doubled, the reaction could not be controlled and a rapid exotherm would result." The team might then recommend steps to prevent feeding wrong concentrations or to stop the feed if the reaction could not be controlled.

A What-If of simple systems can be done by one or two people; a more complex process requires a larger team and longer meetings. AIChE/CCPS estimates that for a small or simple system a What-If analysis will take 4 to 8 hours to prepare, 1 to 3 days to evaluate the process, and 1 to 2 days to document the results. For larger or more complex processes, a What-If will take 1 to 3 days to prepare, 4 to 7 days to evaluate, and 4 to 7 days to document.

WHAT-IF/CHECKLIST

A What-If/Checklist combines the creative, brainstorming aspects of the What-If with the systematic approach of the Checklist. The combination of techniques can compensate for the weaknesses of each. The What-If part of the process can help the team identify hazards and accident scenarios that are beyond the experience of the team members. The checklist provides a more detailed systematic approach that can fill in gaps in the brainstorming process. The technique is generally used to identify the most common hazards that exist in a process. AIChE states that it is often the first PHA conducted on a process, with subsequent analyses using more detailed approaches.

The purpose of a What-If/Checklist is to identify hazards and the general types of accidents that could occur, evaluate qualitatively the effects of the effects, and determine whether safeguards are adequate. Usually the What-If brainstorming precedes the use of the checklist, although the order can be reversed.

The technique usually is performed by a team experienced in the design, operation, and maintenance of the process. The number of people required depends on the complexity of the process. AIChE/CCPS estimates that for a small or simple system a What-If/Checklist analysis will take 6 to 12 hours to prepare, 6 to 12 hours to evaluate the process, and 4 to 8 hours to document the results. For larger or more complex processes, a What-If/Checklist will take 1 to 3 days to prepare, 4 to 7 days to evaluate, and 1 to 3 weeks to document.

HAZOP

The Hazard and Operability Analysis (HAZOP) was originally developed to identify both hazards and operability problems at chemical process plants, particularly for processes using technologies with

which the plant was not familiar. The technique has been found to be useful for existing processes as well. A HAZOP requires an interdisciplinary team and an experienced team leader.

The purpose of a HAZOP is to review a process or operation systematically to identify whether process deviations could lead to undesirable consequences. AIChE states that the technique can be used for continuous or batch processes and can be adapted to evaluate written procedures. It can be used at any stage in the life of a process.

HAZOPs usually require a series of meetings in which, using process drawings, the team systematically evaluates the impact of deviations. The team leader uses a fixed set of guide words and applies them to process parameters at each point in the process. Guide words include "No," "More," "Less," "Part of," "As well as," Reverse," and "Other than." Process parameters considered include flow, pressure, temperature, level, composition, pH, frequency, and voltage. As the team applies the guide words to each process step, they record the deviation, with its causes, consequences, safeguards, and actions needed, or the need for more information to evaluate the deviation.

HAZOPs require more resources than simpler techniques. AIChE states that a simple process or a review with a narrow scope may be done by as few as three or four people, if they have the technical skills and experience. A large or complex process usually requires a team of five to seven people. AIChE/CCPS estimates that for a small or simple system a HAZOP analysis will take 8 to 12 hours to prepare, 1 to 3 days to evaluate the process, and 2 to 6 days to document the results. For larger or more complex processes, a HAZOP will take 2 to 4 days to prepare, 1 to 3 weeks to evaluate, and 2 to 6 weeks to document.

FAILURE MODE AND EFFECTS ANALYSIS (FMEA)

A Failure Mode and Effects Analysis (FMEA) evaluates the ways in which equipment fails and the system's response to the failure. The focus of the FMEA is on single equipment failures and system failures. An FMEA usually generates recommendations for increasing equipment reliability. FMEA does not examine human errors directly, but will consider the impact on equipment of human error. AIChE states that FMEA is "not efficient for identifying an exhaustive list of combinations of equipment failures that lead to accidents."

An FMEA produces a qualitative, systematic list of equipment, failure modes, and effects. The analysis can easily be updated for design or systems changes. The FMEA usually produces a table that, for each item of equipment, includes a description, a list of failure modes, the effects of each failure, safeguards that exist, and actions recommended to address the failure. For example, for pump operating normal, the failure modes would include fails to stop when required, stops when required to run, seal leaks or ruptures, and pump case leaks or ruptures. The effects would detail both the immediate effect and the impact on other equipment. Generally, when analyzing impacts, analysts assume that existing safeguards do not work, AIChE states that "more optimistic assumptions may be satisfactory as long as all equipment failure modes are analyzed on the same basis."

An FMEA requires an equipment list or P&ID, knowledge of the equipment, knowledge of the system, and responses to equipment failure. AIChE states that on average, an hour is sufficient to analyze two to four pieces of equipment. AIChE/CCPS estimates that for a small or simple system an FMEA will take 2 to 6 hours to prepare, 1 to 3 days to evaluate the process, and 1 to 3 days to document the results. For larger or more complex processes, an FMEA will take 1 to 3 days to prepare, 1 to 3 weeks to evaluate, and 2 to 4 weeks to document.

FAULT TREE ANALYSIS (FTA)

A Fault Tree Analysis (FTA) is a deductive technique that focuses on a particular accident or main system failure and provides a method for determining causes of the event. The fault tree is a graphic that displays the combinations of equipment failures and human errors that can result in the accident. The FTA starts with the accident and identifies the immediate causes. Each immediate cause is examined to determine its causes until the basic causes of each are identified. AIChE states that the strength of FTA is its ability to identify combinations of basic equipment and human failures that can lead to an accident, allowing the analyst to focus preventive measures on significant basic causes.

AIChE states that FTA is well suited for analyses of highly redundant systems. For systems vulnerable to single failures that can lead to accidents, FMEA or HAZOP are better techniques to use. FTA is often used when another technique has identified an accident that requires more detailed analysis. The FTA looks at component failures (malfunctions that require that the component be repaired) and faults (malfunctions that will remedy themselves once the conditions change). Failures and faults are divided into three groups: primary failures and faults occur when the equipment is operating in the environment for which it was intended; secondary failures and faults occur when the system is operating outside of intended environment; and command faults and failures are malfunctions where the equipment performed as designed but the system that commanded it malfunctioned.

An FTA requires a detailed knowledge of how the plant or system works, detailed process drawings and procedures, and knowledge of component failure modes and effects. AIChE states that FTAs need well trained and experienced analysts. Although a single analyst can develop a fault tree, input and review from others is needed

AIChE/CCPS estimates that for a small or simple system an FTA will take 1 to 3 days to prepare, 3 to 6 days for model construction, 2 to 4 days to evaluate the process, and 3 to 5 days to document the results. For larger or more complex processes, an FTA will take 4 to 6 days to prepare, 2 to 3 weeks for model constructions, 1 to 4 weeks to evaluate, and 3 to 5 weeks to document.

Other Techniques

The rule allows you to use other techniques if they are functionally equivalent. The AIChE Guidelines includes descriptions of a number of other techniques including Preliminary Hazard Review, Cause-Consequence Analysis, Event Tree Analysis, and Human Reliability Analysis. You may also develop a hybrid technique that combines features of several techniques or apply more than one technique.

Selecting a Technique

Exhibit 7A-1 is adapted from the AIChE Guidelines and indicates which techniques are appropriate for particular phases in a process's design and operation.

EXHIBIT 7A-1

APPLICABILITY OF PHA TECHNIQUES

	Checklist	What-If	What-If-Checklist	HAZOP	FMEA	FTA
R&D		✓				
Design	✓	✓	✓			
Pilot Plant Operation	✓	✓	✓	✓	✓	✓
Detailed Engineering	✓	✓	✓	✓	✓	✓
Construction/Start-Up	✓	✓	✓			
Routine Operation	✓	✓	✓	✓	✓	✓
Modification	✓	✓	✓	✓	✓	✓
Incident Investigation		✓		✓	✓	✓
Decommissioning	✓	✓	✓			

Factors in Selecting a Technique

Type of process will affect your selection of a technique. AIChE states that most of the techniques can be used for any process, but some are better suited for certain processes than others. FMEA efficiently analyzes the hazards associated with computer and electronic systems; HAZOPs do not work as well with these. Processes or storage units designed to industry or government standards can be handled with checklists.

AIChE lists What-If, What-If/Checklist, and HAZOP as better able to handle batch processes than FTA or FMEA because the latter do not easily deal with the need to evaluate the time-dependent nature of batch operations.

Analysis of multiple failure situations is best handled by FTA. Single-failure techniques, such as HAZOP and FMEA, are not normally used to handle these although they can be extended to evaluate a few simple accident situations involving more than one event.

AIChE states that when a process has operated relatively free of accidents for a long time, the potential for high consequence events is low, and there have been few changes to invalidate the experience base, the less exhaustive techniques, such as a Checklist, can be used. When the opposite is true, the more rigorous techniques are more appropriate.

A final factor in selecting a technique is time required for various techniques. Exhibit 7A-2 summarizes AIChE's estimates of the time required for various steps. The full team is usually involved in the evaluation step; for some techniques, only the team leader and scribe are involved in the preparation and documentation steps.

EXHIBIT 7A-2

TIME AND STAFFING FOR PHA TECHNIQUES

	Checklist	What-If	What-If Checklist	HAZOP	FMEA	FTA
Simple/Small System						
# Staff	1-2	2-3	2-3	3-4	1-2	2-3
Preparation	2-4 h	4-8 h	6-12 h	8-12 h	2-6 h	1-3 d
Modeling						3-6 d
Evaluation	4-8 h	1-3 d	6-12 h	1-3 d	1-3 d	2-4 d
Documentation	4-8 h	1-2 d	4-8 h	2-6 d	1-3 d	3-5 d
Large/Complex Process						
# Staff	1-2	3-5	3-5	5-7	2-4	2-5
Preparation	1-3 d	1-3 d	1-3 d	2-4 d	1-3 d	4-6 d
Modeling						2-3 w
Evaluation	3-5 d	4-7 d	4-7 d	1-3 w	1-3 w	1-4 w
Documentation	2-4 d	4-7 d	1-3 w	2-6 w	2-4 w	3-5 w

h = hours d = days (8 hours) w = weeks (40 hours)

CHAPTER 8: EMERGENCY RESPONSE PROGRAM

If you have at least one Program 2 or Program 3 process at your facility, then part 68 may require you to implement an emergency response program, consisting of an emergency response plan, emergency response equipment procedures, employee training, and procedures to ensure the program is up-to-date. This requirement applies if your employees will respond to some releases involving regulated substances. (See the box on the next page for more information on What is Response?)

EPA recognizes that, in some cases (particularly for retailers and other small operations with few employees), it may not be appropriate for employees to conduct response operations for releases of regulated substances. For example, it would be inappropriate, and probably unsafe, for an ammonia retailer with only one full-time employee to expect that a tank fire could be handled without the help of the local fire department or other emergency responder. EPA does not intend to force such facilities to develop emergency response capabilities. At the same time, you are responsible for ensuring effective emergency response to any releases at your facility. If your local public responders are not capable of providing such response, you must take steps to ensure that effective response is available (e.g., by hiring response contractors).

8.1 NON-RESPONDING FACILITIES (§ 68.90(b))

EPA has adopted a policy for non-responding facilities similar to that adopted by OSHA in its Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard (29 CFR 1910.120), which allows certain facilities to develop an emergency action plan to ensure employee safety, rather than a full-fledged emergency response plan. If your employees will not respond to accidental releases of regulated substances, then you need not comply with the emergency response plan and program requirements. Instead, you are simply required to coordinate with local response agencies to ensure that they will be prepared to respond to an emergency at your facility. (You may want to briefly review the program design issues discussed in 8.2 prior to making this decision.) This will help to ensure that your community has a strategy for responding to and mitigating the threat posed by a release of a regulated substance from your facility. To do so, you must ensure that you have set up a way to notify emergency responders when there is need for a response. Coordination with local responders also entails the following steps:

- If you have a covered process with a regulated toxic, work with the local emergency planning entity to ensure that the facility is included in the community emergency response plan prepared under EPCRA regarding a response to a potential release.

- If you have a covered process with a regulated flammable, work with the local fire department regarding a response to a potential release.

Although you do not need to describe these activities in your risk management plan, to document your efforts you should keep a record of:

- The emergency contact (i.e., name or organization and number) that you will call for a toxic or flammable release, and

What is "Response"?

EPA interprets "response" to be consistent with the definition of response specified under OSHA's HAZWOPER Standard. OSHA defines emergency response as "a response effort by employees from outside the immediate release area or by other designated responders ... to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance." The key factor here is that responders are designated for such tasks by their employer. This definition *excludes* "responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel" as well as "responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure)." Thus, if you expect your employees to take action to end a small leak (e.g., shutting a valve) or clean up a spill that does not pose an immediate safety or health hazard, this action could be considered an incidental response and you would not need to develop an emergency response program if your employees are limited to such activities.

However, due to the nature of the regulated substances subject to EPA's rule, only the most minor incidents would be included in this exception. In general, most activities will qualify as a response due to the immediacy of the dispersion of a toxic plume or spread of a fire, the volatilization of a spill, and the threat to people on and off site. As a result, if you will have your employees involved in any substantial way in responding to releases, you will need to develop an emergency response program. Your emergency response procedures need only apply to "response" actions; other activities will be described in your maintenance and operating procedures.

- The organization that you worked with on response procedures.

The remainder of this chapter is applicable only to those facilities which will conduct a more extensive level of response operations. As noted above, you may want to review the next section before making a decision on whether the facility will take responsibility for conducting any response activities.

8.2 ELEMENTS OF AN EMERGENCY RESPONSE PROGRAM (§ 68.95)

If you will respond to releases of regulated substances with your own employees, your emergency response program must consist of the following elements:

- An emergency response plan (maintained at the facility) that includes:
  - Procedures for informing the public and emergency response agencies about releases,
  - Documentation of proper first aid and emergency medical treatment necessary to treat human exposures, and
  - Procedures and measures for emergency response.

What is a Local Emergency Planning Committee?

Local emergency planning committees (LEPCs) were formed under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986. The committees are designed to serve as a community forum for issues relating to preparedness for emergencies involving releases of hazardous substances in their jurisdictions. They consist of representatives from local government (including law enforcement and firefighting), local industry, transportation groups, health and medical organizations, community groups, and the media. LEPCs:

- ✦ Collect information from facilities on hazardous substances that pose a risk to the community;
- ✦ Develop a contingency plan for the community based on this information; and
- ✦ Make information on hazardous substances available to the general public.

Contact the mayor's office or the county emergency management office for more information on your LEPC.

- ◆ Procedures for using, inspecting, testing, and maintaining your emergency response equipment;

- ◆ Training for all employees in relevant procedures; and

- ◆ Procedures to review and update, as appropriate, the emergency response plan to reflect changes at the facility and ensure that employees are informed of changes.

Finally, your plan must be coordinated with the community plan developed under the Emergency Planning and Community Right-to-Know Act (EPCRA, also known as SARA Title III). In addition, at the request of local emergency planning or response officials, you must provide any information necessary for developing and implementing the community plan.

In keeping with the approach outlined in Chapter 6, EPA is not requiring facilities to document training and maintenance activities. However, as noted above, facilities must maintain an on-site emergency response plan as well as emergency response equipment maintenance and program evaluation procedures.

Although EPA's required elements are essential to any emergency response program, they are not comprehensive guidelines for creating an adequate response capability. Rather than establish another set of federal requirements for an emergency response program, EPA has limited the provisions of its rule to those the CAA mandates. If you have a regulated substance on site, you are already subject to at least one emergency response rule: OSHA's emergency action plan requirements (29 CFR 1910.38). Under OSHA HAZWOPER, any facility that handles "hazardous substances" (a broad term that includes all of the CAA regulated substances and thus applies to all facilities with covered processes) must comply with either 29 CFR

1910.38(a) or 1910.119(q). If you have a hazmat team, you are subject to the 29 CFR 1910.119(q) requirements. If you determine that the emergency response programs you have developed to comply with these other rules satisfy the elements listed at the beginning of this section, you will not have to do anything additional to comply with these elements. Additional guidance on making this decision is provided in section 8.5.

In addition, be careful not to confuse writing a set of emergency response procedures in a plan with developing an emergency response program. An emergency response plan is only one element of the integrated effort that makes an emergency response program. Although the plan outlines the actions and equipment necessary to respond effectively, training, program evaluation, equipment maintenance, and coordination with local agencies must occur regularly if your plan is to be useful in an emergency: The goal of the program is to enable you to respond quickly and effectively to any emergency. The documents listed in Exhibit 8-1 may be helpful in developing specific elements of your emergency response program.

Exhibit 8-1
Federal Guidance on Emergency Planning and Response

Hazardous Materials Emergency Planning Guide (NRT-1), National Response Team, March 1987. Although designed to assist communities in planning for hazmat incidents, this guide provides useful information on developing a response plan, including planning teams, plan review, and ongoing planning efforts.

Criteria for Review of Hazardous Materials Emergency Plans (NRT-1A), National Response Team, May 1988. This guide provides criteria for evaluating response plans.

North American Emergency Response Guidebook (NAERG96), U.S. Department of Transportation, 1996. This guidebook lists over 1,000 hazardous materials and provides information on their general hazards and recommended isolation distances.

Response Information Data Sheets (RIDS), US EPA and National Oceanic and Atmospheric Administration. Developed for use with the Computer-Aided Management of Emergency Operations (CAMEO) software, these documents outline the properties, hazards, and basic safety and response practices for thousands of hazardous chemicals.

Finally, remember that under the General Duty Clause of CAA section 112(r)(1) you are responsible for ensuring that any release from your processes can be handled effectively. If you plan to rely on local responders for some or all of the response, you must determine that those responders have both the equipment and training needed to do so. If they do not, you must take steps to meet any needs, either by developing your own response capabilities, developing mutual aid agreements with other facilities, hiring response contractors, or providing support to local responders so they can acquire equipment or training.

RELATIONSHIP TO HAZWOPER

If you choose to establish and maintain onsite emergency response capabilities, then you will be subject to the detailed provisions of the OSHA or EPA HAZWOPER Standard. HAZWOPER covers preparing an emergency response plan, employee training, medical monitoring of employees, recordkeeping, and other issues. Call your state or federal district OSHA office (see the list in Appendix D) for more information on complying with the HAZWOPER Standard. State and local governments in states without a delegated OSHA program are subject to HAZWOPER under EPA's 40 CFR part 311.

How Does the Emergency Response Program Apply?

The requirements for the emergency response program are intended to apply across all covered processes at a facility. Although certain elements of the program (e.g., how to use specific items of response equipment) may differ from one process to another, EPA does not intend or expect you to develop a separate emergency response program for each covered process. With this in mind, you should realize that your emergency response program will probably apply to your entire facility, although technically it need only apply to covered processes.

For example, a facility may have two storage tanks, one containing slightly more than a threshold quantity of a regulated substance and one with slightly less. The facility is likely to adopt the same response approach (e.g., procedures, equipment, and training) for releases whether or not the process is "covered." Similarly, a facility may have two adjacent flammables storage tanks, one containing a regulated substance above the threshold and the other containing another, unlisted flammable. The facility is likely to adopt the same approach for releases whether or not the process is "covered."

8.3 DEVELOPING AN EMERGENCY RESPONSE PROGRAM

The development of an emergency response program should be approached systematically. As described in section 8.2, all facilities complying with these emergency response program provisions will already be subject to OSHA HAZWOPER. As a result, you are likely to fall into one of two groups:

- You have already met several federal requirements for emergency planning and are interested in developing an integrated program to minimize duplication (section 8.4).

- You have a pre-existing emergency response program (perhaps based on an internal policy decision) and need to determine what additional activities you will need to conduct (section 8.5).

STEPS FOR GETTING STARTED

The following steps outline a systematic approach that can serve as the framework for the program development process in each of these cases. Following these initial steps will allow you to conduct the rest of the process more efficiently.

Form an emergency response program team. The team should consist of employees with varying degrees of emergency response responsibilities, as well as personnel with expertise from each functional area of your facility. You should consider including persons from the following departments or areas:

- Maintenance;
- Operations or line personnel;
- Upper and line management;
- Legal;
- Fire and hazmat response;
- Environmental, health, and safety affairs;
- Training;
- Security;
- EPCRA section 302 emergency coordinator (if one exists);
- Public relations; and
- Personnel.

Of course, the membership of the team will need to be more or less extensive depending on the scope of the emergency response program. A three-member team may be appropriate for a small facility with a couple of process operators cross-trained as fire responders, while a facility with its own hazmat team and environmental affairs department may need a dozen representatives.

Collect relevant facility documents. Members of the development team should collect and review all of the following:

- Existing emergency response plans and procedures;
- Submissions to the LEPC under EPCRA sections 302 and 303;
- Hazard evaluation and release modeling information;
- Hazard communication and emergency response training;
- Emergency drill and exercise programs;
- After-action reports and response critiques; and
- Mutual aid agreements.

Identify existing programs to coordinate efforts. The team should identify any related programs from the following sources:

- Corporate- and industry-sponsored safety, training, and planning efforts; and

- Federal, state, and local government safety, training, and planning efforts (see Exhibit 8-2).

Exhibit 8-2
Federal Emergency Planning Regulations

The following is a list of some of the federal emergency planning regulations:

- EPA's Oil Pollution Prevention Regulation (SPCC and Facility Response Plan Requirements) - 40 CFR part 112.7(d) and 112.20-.21;
- MM's Facility Response Plan Regulation - 30 CFR part 254;
- RSPA's Pipeline Response Plan Regulation - 49 CFR part 194;
- USCG's Facility Response Plan Regulation - 33 CFR part 154, Subpart F;
- EPA's Risk Management Programs Regulation - 40 CFR part 68;
- OSHA's Emergency Action Plan Regulation - 29 CFR 1910.38(a);
- OSHA's Process Safety Standard - 29 CFR 1910.119;
- OSHA's HAZWOPER Regulation - 29 CFR 1910.120;
- OSHA's Fire Brigade Regulation - 29 CFR 1910.156;
- EPA's Resource Conservation and Recovery Act Contingency Planning Requirements - 40 CFR part 264, Subpart D, 40 CFR part 265, Subpart D, and 40 CFR 279.52.
- EPA's Emergency Planning and Community Right-to-Know Act Requirements - 40 CFR part 355. (These planning requirements apply to communities, rather than facilities, but will be relevant when facilities are coordinating with local planning and response entities).
- EPA's Storm water Regulations - 40 CFR 122.26.

Facilities may also be subject to state and local planning requirements.

Determine the status of each required program element. Using the information collected, you should assess whether each required program element (see section 8.2) is:

- In place and sufficient to meet the requirements of part 68;
- In place, but not sufficient to meet the requirements of Part 68; or
- Not in place.

This examination will shape the nature of your efforts to complete the emergency response program required under the risk management program. For example, if you are already in compliance with OSHA's HAZWOPER Standard, you have probably satisfied most, if not all, of the requirements for an emergency response program. Section 8.6 explains the intent of each of EPA's requirements to help you determine whether you are already in compliance.

Take additional actions as necessary.

TAILORING YOUR PROGRAM TO YOUR HAZARDS

If your processes and chemicals pose a variety of hazards, it may be necessary to tailor some elements of your emergency response program to these specific hazards. Unless each part of your program element is appropriate to the release scenarios that may occur, your emergency response program cannot be fully effective. Your program should include core elements that are appropriate to most of the scenarios, supplemented with more specific response information for individual scenarios. This distinction should be reflected in your emergency response plan, which should explain when to access the general and specific response information. To do this, you will need to consider the following four steps:

- Identify and characterize the hazards for each covered process. The process hazards analysis (see Chapter 7) or hazard review (see Chapter 6), and offsite consequence analysis (see Chapter 4) should provide this information.

- For each program element, compare the activities involved in responding to each type of accident scenario and decide if they are different enough to require separate approaches. For example, response equipment and training will likely be different for releases of toxic versus flammable gases.

- For those program elements that may be chemical- or process-specific, identify what and how systems and procedures need to be modified. For example, if existing mitigation systems are inadequate for responding to certain types of releases, you will need to consider what additional types of equipment are needed.

- Consider possible causes of emergencies in developing your emergency response program. You should consider both the hazards at your facility and in the surrounding environment. In making this determination, you should consider your susceptibility to:

  - Fires, spills, and vapor releases;
  - Floods, temperature extremes, tornadoes, earthquakes, and hurricanes;
  - Loss of utilities, including power failures; and
  - Train derailments, bomb threats, and other man-made disasters.

8.4 INTEGRATION OF EXISTING PROGRAMS

A number of other federal statutes and regulations require emergency response planning (see Exhibit 8-2). On June 5, 1996, the National Response Team (NRT), a multi-agency group chaired by EPA, published the Integrated Contingency Plan Guidance in the Federal Register (61 FR 28642). This guidance is intended to be used by facilities to prepare emergency response plans for responding to releases of oil and hazardous substances. The guidance provides a mechanism for consolidating multiple plans that you prepared to comply with various regulations into a single, functional emergency response plan or integrated contingency plan (ICP).

The ICP guidance does not change existing regulatory requirements; rather, it provides a format for organizing and presenting material currently required by regulations. Individual regulations are often more detailed than the ICP guidance. To ensure full compliance, you will still need to read and comply with all of the federal regulations that apply. The guidance contains a series of matrices designed to assist you in consolidating various plans while documenting compliance with these federal requirements.

The NRT and the agencies responsible for reviewing and approving plans to which the ICP option applies have agreed that integrated response plans prepared according to the guidance will be acceptable and the federally preferred method of response planning. The NRT anticipates that future development of all federal regulations addressing emergency response planning will incorporate use of the ICP guidance.

As shown in Exhibit 8-3, the ICP format is organized into three main sections: an introductory section, a core plan, and a series of supporting annexes. The notice published in the Federal Register explains the intended structure of the ICP and provides detailed annotation. EPA's EPCRA/RCRA/Superfund Hotline can supply you with a copy and answer general questions about the guidance; for further information and guidance on complying with specific regulations, you should contact the appropriate federal agencies.

AN APPROACH TO INTEGRATION

Like many other facilities, you may have opted to develop and maintain separate documents and procedures for each federal emergency planning requirement. However, meeting the Clean Air Act emergency response requirements provides you with the opportunity to integrate several existing programs. Integrating the various emergency response efforts you conduct (both those mandated by management and by government) will increase the usefulness of your emergency preparedness activities and decrease the burden associated with maintaining multiple programs. Integration will improve your chances to respond effectively to a release by streamlining your training and eliminating overlaps and conflicts in the roles and responsibilities of your employees under different programs. However, it is important to note that, although you are encouraged to integrate your emergency response efforts, it is not a requirement of the Clean Air Act.

If you have multiple emergency response programs, you should consider integrating them into a single program with procedures for responding to your most likely release scenarios. The ICP Guidance discussed above provides comparison matrices for a number of federal programs that will help you accomplish the following:

- Distinguish the individual regulatory provisions with which you must comply, and
- Identify where an integrated effort can meet the requirements of two or more regulations.

The requirements of various emergency response programs may be similar, but the subtle differences between requirements will likely determine the degree to which

Exhibit 8-3
Integrated Contingency Plan Outline

Section I - Plan Introduction Elements

1. Purpose and Scope of Plan Coverage
2. Table of Contents
3. Current Revision Date
4. General Facility Identification Information

a. Facility name
b. Owner/operator/agent (include physical and mailing address and phone number)
c. Physical address of the facility (include county/parish/borough, latitude/longitude, and directions)
d. Mailing address of the facility (correspondence contact)
e. Other identifying information (e.g., ID numbers, SIC Code, oil storage start-up date)
f. Key contact(s) for plan development and maintenance
g. Phone number for key contact(s)
h. Facility phone number
I. Facility fax number

Section II - Core Plan Elements

1. Discovery
2. Initial Response

a. Procedures for internal and external notifications (i.e., contact, organization name, and phone number of facility emergency response coordinator, facility response team personnel, federal, state, and local officials)
b. Establishment of a response management system
c. Procedures for preliminary assessment of the situation, including an identification of incident type, hazards involved, magnitude of the problem, and resources threatened
d. Procedures for establishment of objectives and priorities for response to the specific incident, including:
    (1) Immediate goals/tactical planning (e.g., protection of workers and public as priorities)
    (2) Mitigating actions (e.g., discharge/release control, containment, and recovery, as appropriate)
    (3) Identification of resources required for response
e. Procedures for implementation of tactical plan
f. Procedure for mobilization of resources

3. Sustained Actions
4. Termination and Follow-Up Actions

Section III - Annexes

Annex 1. Facility and Locality Information

a. Facility maps
b. Facility drawings
c. Facility description/layout, including identification of facility hazards and vulnerable resources and populations on and off the facility which may be impacted by an incident

Exhibit 8-3 (continued)

Annex 2. Notification
a. Internal notifications
b. Community notifications
c. Federal and state agency notifications
Annex 3. Response Management System
a. General
b. Command
c. Operations
d. Planning
e. Logistics
f. Finance/procurement/administration
Annex 4. Incident Documentation
a. Post accident investigation
b. Incident history
Annex 5. Training and Exercises/Drills
Annex 6. Response Critique and Plan Review and Modification Process
Annex 7. Prevention
Annex 8. Regulatory Compliance and Cross-Reference Matrices

integration is a feasible and beneficial undertaking (see Exhibit 8-4). To help you identify the relevant rules and regulations, the ICP Guidance provides section-by-section regulatory citations for each emergency response program element for each of the regulatory programs listed in Exhibit 8-2.

8.5 HAVE I MET PART 68 REQUIREMENTS?

EPA believes that the creation of multiple response plans to meet slightly different federal or state standards is counterproductive, diverting resources that could be used to develop better response capabilities. Therefore, as part of the overall effort to reduce the imposition of potentially duplicative or redundant federal requirements, EPA has limited its requirements for the emergency response program to the general provisions mandated by Congress, as described in Section 8.2.

As a result, EPA believes that facilities subject to other federal emergency planning requirements may have already met the requirements of these regulations. For example, plans developed to comply with other EPA contingency planning requirements and the OSHA HAZWOPER rule (29 CFR 1910.120) will likely meet the requirements for the emergency response plan (and most of the requirements for the emergency response program). The following discussion presents some general guidance on what actions you need to take for each of the required elements.

EMERGENCY RESPONSE PLAN

If you already have a written plan to comply with another planning regulation, you do not need to write another plan, but only add to it as necessary to cover the elements listed below.

Exhibit 8-4
Sample Integration Effort

Written site evacuation procedures are required by several emergency planning regulations. In keeping with the spirit of the ICP Guidance, rather than preparing multiple sets of evacuation procedures (and possibly introducing dangerous errors as components are revised and updated), you may want to compile a single set of procedures that includes the specific elements mandated by all of the regulations. For example, If you have one or more adjacent operating areas that evacuate to the same location(s), this approach will be very effective. On the other hand, if you have widely separated operating areas with different evacuation routes and assembly points, integration will be less useful.

Area	Signal	Escape Route	Assembly Point	Supervisor
Shipping Room	Horn	Blue	Front Gate	Shipping Supervisor
Control Room	Horn	Green	Parking Lot	Lead Operator
Tank Farm	Radio	Red	Side Gate	Inspector

Keep in mind: At a minimum, your plan must describe:

- Your procedures for informing the public and offsite emergency response agencies of a release. This must include the groups and individuals that will be contacted and why, the means by which they will be contacted, the time frame for notification, and the information that will be provided.

- The proper first aid and emergency medical treatment for employees, first responders, and members of the public who may have been exposed to a release of a regulated substance. This must include standard safety precautions for victims (e.g., apply water to exposed skin immediately) as well as more detailed information for medical professionals. You must also indicate who is likely to be responsible for providing the appropriate treatment: an employee, an employee with specialized training, or a medical professional.

- Your procedures for emergency response in the event of a release of a regulated substance. This must include descriptions of the actions to be taken by employees and other individuals on-site over the entire course of the release event:

  - Activation of alarm systems and interpretation of signals;
  - Safe evacuation, assembly, and return;
  - Selection of response strategies and incident command structure;
  - Use of response equipment and other release mitigation activities; and
  - Post-release equipment and personnel cleanup and decontamination.

PLANNING COORDINATION

One of the most important issues in an emergency response program is deciding which response actions will be assigned to employees and which will be handled by offsite personnel. As a result, talking to public response organizations will be critical when you develop your emergency response procedures. Although EPA is not requiring you to be able to respond to a release alone, you should not simply assume that local responders will be able to manage an emergency. You must work with them to determine what they can do, and then expand your own abilities or establish mutual aid agreements or contracts to handle those situations for which you lack the appropriate training or equipment.

If you have already coordinated with local response agencies on how to respond to potential releases of regulated substances and you have ensured an effective response, you do not need to take any further action.

Keep in mind: Your coordination must involve planning for releases of regulated substances from all covered processes and must cover:

- What offsite response assistance you will require for potential release scenarios, including fire-fighting, security, and notification of the public;
- How you will request offsite response assistance; and
- Who will be in charge of the response operation and how will authority be delegated down the internal and offsite chain of command.

Coordination equivalent to that required for planning for extremely hazardous substances under EPCRA sections 302-303 will be considered sufficient to meet this requirement. A more detailed discussion of this element is provided in 8.6.

EMERGENCY EQUIPMENT

If you already have written procedures for using and maintaining your emergency response equipment, you do not need to write new procedures.

Keep in mind: Your procedures must apply to any emergency equipment relevant to a response involving a covered process, including all detection and monitoring equipment, alarms and communications systems, and personal protective equipment not used as part of normal operations (and thus not subject to the prevention program requirements related to operating procedures and maintenance). The procedures must describe:

- How and when to use the equipment properly;
- How and when the equipment should receive routine maintenance; and
- How and when the equipment should be inspected and tested for readiness.

Written procedures comparable to those necessary for process-related equipment under the OSHA PSM Standard and EPA's Program 2 and 3 Prevention Programs will be considered sufficient to meet this requirement.

EMPLOYEE TRAINING

If you already train your employees in how to respond to (or evacuate from) releases of regulated substances, then you do not need a new training program.

Keep in mind: Your training must address the actions to take in response to releases of regulated substances from all covered processes. The training should be based directly on the procedures that you have included in your emergency response plan and must be given to all employees and contractors on site. Individuals should receive training appropriate to their responsibilities:

- If they will only need to evacuate, then their training should cover when and how to evacuate their location.
- If they may need to activate an alarm system in response to a release event, then their training should cover when and how to use the alarm system.
- If they will serve on an emergency response team, then their training should cover how to use emergency equipment and how the incident command system works.

Emergency response training conducted in compliance with the OSHA HAZWOPER Standard and 29 CFR 1910.38 will be considered sufficient to meet this requirement.

RESPONSE PLAN EVALUATION

If you already have a formal practice for regular review and updates of your plan based on changes at the facility, you do not need to develop additional procedures.

Keep in mind: You must also identify the types of changes to the facility that would cause the plan to be updated (e.g., a new covered process) and include a method of communicating any changes to the plan to your employees (e.g., through training). You may want to set up a regular schedule on which you review your entire emergency response plan and identify any special conditions (e.g., a drill or exercise) that could result in an interim review.

8.6 COORDINATION WITH LOCAL EMERGENCY PLANNING ENTITIES (§ 68.95(c))

Once you determine that you have at least one covered process, you should open communications with local emergency planning and response officials, including your local emergency planning committee if one exists. Because your LEPC consists of representatives from many local emergency planning and response agencies, it is likely to be the best source of information on the critical emergency response issues in your community. However, in some cases, there may not be an active LEPC in your community. If so, or if your state has not designated your community as an emergency planning district under EPCRA, you will likely need to contact local

agencies individually to determine which entities (e.g., fire department, emergency management agency, police department, civil defense office, public health agency) have jurisdiction for your facility.

KEY COORDINATION ISSUES

If you have any of the toxic regulated substances above the threshold quantity, you should have already designated an emergency coordinator to work with the LEPC on chemical emergency preparedness issues (a requirement for certain facilities regulated under EPCRA). If you have not (or if your facility has only regulated flammable substances), you may want to do so at this time. The emergency coordinator should be the individual most familiar with your emergency response program (e.g., the person designated as having overall responsibility for this program in your management system — see Chapter 5).

Involvement in the activities of your LEPC can have a dramatically positive effect on your emergency response program, as well as on your relationship with the surrounding community. Your LEPC can provide technical assistance and guidance on a number of topics, such as conducting response training and exercises, developing mutual aid agreements, and evaluating public alert systems. The coordination process will help both the community and the facility prepare for an emergency, reducing expenditures of time and money, as well as helping eliminate redundant efforts.

You should consider providing the LEPC with draft versions of any emergency response program elements related to local emergency planning efforts. This submission can initiate a dialogue with the community on potential program improvements and lead to coordinated training and exercise efforts. In return, your LEPC can support your emergency response program by providing information from its own emergency planning efforts, including:

- Data on wind direction and weather conditions, or access to local meteorological data, to help you make decisions related to the evacuation of employees and public alert notification;
- Lists of emergency response training programs available in the area for training police, medical, and fire department personnel, to help you identify what training is already available;
- Schedules of emergency exercises designed to test the community response plan to spur coordinated community-facility exercises;
- Lists of emergency response resources available from both public and private sources to help you determine whether and how a mutual aid agreement could support your program; and
- Details on incident command structure, emergency points of contact, availability of emergency medical services, and public alert and notification systems.

Upon completion of your emergency response plan, you should coordinate with the LEPC, local response organizations, local hospitals, and other response organizations (e.g., state hazmat team) and offer them a copy of the plan. In some instances, only a portion of the plan may be of use to individuals or organizations; in such cases, you should consider making only that portion of the plan available. For instance, it may be appropriate to send a hospital only the sections of your plan that address emergency medical procedures and decontamination.

You may also want to provide your LEPC and local response entities with a description of your emergency response program elements, as well as any important subsequent amendments or updates, to ensure that the community is aware of the scope of your facility response efforts prior to an emergency. Although the summary of your emergency response program will be publicly available as part of your RMP, this information may not be as up-to-date or as comprehensive. Remember, the LEPC has been given the authority under EPCRA and Clean Air Act regulations to request any information necessary for preparing the community response plan.

Planning for Flammable Substances

In the case of regulated flammable substances, the fire department with jurisdiction over your facility may already be conducting fire prevention inspections and pre-planning activities under its own authority. Your participation in these efforts (as requested) will allow local responders to gather the information they need and prepare for an emergency. If there is no local fire department, or if there is only a volunteer fire department in your area, you may need to contact other local response or planning officials (e.g., police) to determine how you can work with the community.

CHAPTER 9: RISK MANAGEMENT PLAN (PART 68, SUBPART G)

You must submit one risk management plan (RMP) to EPA for all of your covered processes (§ 68.150). EPA is developing an electronic submission program for your use. If you cannot submit electronically, you may request a hardship waiver and submit your RMP on paper. In either case, your RMP is due no later than the latest of the following dates:

- June 21, 1999;
- The date on which a regulated substance is first present above a threshold quantity in a process; or
- Three years after the date on which a regulated substance is first listed by EPA.

EPA's automated tool for submitting RMPs, RMP*Submit™, discussed below, will be available in January 1999.

9.1 ELEMENTS OF THE RMP

The length and content of your RMP will vary depending on the number and program level of the covered processes at your facility. See Chapter 2 for detailed guidance on how to determine the program levels of each of the covered processes at your facility.

Any facility with one or more covered processes must include in its RMP:

- An executive summary (§ 68.155);
- The registration for the facility (§ 68.160);
- The certification statement (§ 68.185);
- A worst-case scenario for each Program 1 process; at least one worst-case scenario to cover all Program 2 and 3 processes involving regulated toxic substances; at least one worst-case scenario to cover all Program 2 and 3 processes involving regulated flammables (§ 68.165(a));
- The five-year accident history for each process (§ 68.168); and
- A summary of the emergency response program for the facility (§ 68.180).

Any facility with at least one covered process in Program 2 or 3 must also include in its RMP:

- At least one alternative release scenario for each regulated toxic substance in Program 2 or 3 processes and at least one alternative release scenario to cover all regulated flammables in Program 2 or 3 processes (§ 68.165(b));
- A summary of the prevention program for each Program 2 process (§ 68.170); and

- A summary of the prevention program for each Program 3 process (§ 68. 175).

Subpart G of part 68 (see Appendix A) provides more detail on the data required for each of the elements. The actual RMP form, however, will contain more detailed guidance to make it possible to limit the number of text entries. For example, the rule requires you to report on the major hazards identified during a PHA or hazard review and on public receptors affected by worst-case and alternative case scenarios. The RMP will provide a list of options for you to check for these elements. Except for the executive summary, the RMP will consist primarily of yes/no answers, numerical information (e.g., dates, quantities, distances), and a few text answers (e.g., names, addresses, chemical identity). Where possible, RMP*Submit™ will provide "pick lists" to help you complete the form. For example, RMP*Submit™ will provide a list of regulated substances and automatically fill in the CAS numbers when you select a substance.

EPA will provide instructions for each of the data elements to be reported in the RMP with RMP*Submit™. The instructions will explain each data element and help you understand what acceptable data are for each. The instructions will be made available with the software and will be posted on EPA's web site.

9.2 RMP SUBMISSION

ELECTRONIC SUBMISSION

By January 1999, EPA will make RMP*Submit™ available to complete and file your RMP. RMP*Submit™ will do the following:

- Provide a user-friendly, PC-based RMP Submission System available on diskettes and via the Internet;
- Use a standards-based, open systems architecture so private companies can create compatible software; and
- Perform data quality checks, accept limited graphics, and provide on-line help including defining data elements and providing instructions.

The software will run on Windows 3.1 and above. There will not be a DOS or MAC version.

Further details on this system will be made available as the system is completed. RMPs will be submitted to an EPA RMP Record Center on disk.

HARD COPY SUBMISSION

If you are unable to submit electronically for any reason, just fill out the Electronic Waiver form available in the RMP*Submit™ manual and send it in with your RMP. See the RMP*Submit manual for more information on the Electronic Waiver.

9.3 ISSUES PERTAINING TO SUBMISSIONS OF AND ACCESS TO CLASSIFIED, CONFIDENTIAL BUSINESS INFORMATION (CBI), AND TRADE SECRETS

WHAT SHOULD I DO ABOUT CLASSIFIED INFORMATION?

Only Federal agencies and their contractors at Federal facilities may make claims of classified information. If you have such a claim, EPA urges you not to submit the information you can claim as classified as part of your RMP. If any classified information is critical to the clarity and completeness of any part of the RMP, you should submit that information separately, on paper, in an annex to the RMP. Any annex marked as classified will be reviewed only by Federal and state representatives who have received security clearances and are thereby authorized to review such information.

WHAT SHOULD I DO ABOUT CONFIDENTIAL BUSINESS INFORMATION (CBI)?

Under CAA section 114(c) and 40 CFR part 2, you may claim information included in your RMP as CBI. To qualify for CBI protection, you must be able to show that the information meets the substantive criteria set forth in 40 CFR 2.301. These criteria generally require that the data be commercial or financial, that they not be available to the public through other means, that you take appropriate steps to prevent disclosure, and that disclosure of the data would be likely to cause substantial harm to your competitive position. Review of any CBI claims will be handled as provided for in 40 CFR part 2. However, EPA has proposed to find that certain RMP data elements are not claimable as CBI because they do not convey any business-sensitive information. EPA has also proposed specific procedures for submission of CBI claims for RMPs. The Agency will update this guidance when EPA issues a final rule addressing these issues.

9.4 RESUBMISSION AND UPDATES (§ 68.190)

When you are required to update and resubmit your RMP is based on whether and what changes occur at your facility. Please refer to the Exhibit 9-1 and note that you are required to update and resubmit your RMP on the **earliest** of the dates that apply to your facility:

WHEN DOES THE OFFSITE CONSEQUENCE ANALYSIS (OCA) NEED TO BE REVISED?

You'll need to revise your OCA when a change at your facility results in the distance to an endpoint from a worst-case release rising or falling by at least a factor of two. For example, if you increase your inventory substantially or install passive mitigation to limit the potential release rate, you should re-estimate the distance at an endpoint. If the distance is at least doubled or halved, you must revise the RMP. For most substances, the quantity that would be released would have to increase by more than a factor of five to double the distance to an endpoint.

CAN I FILE PREDICTIVELY?

Predictive filing is an option that allows you to submit an RMP that includes regulated substances that may not be held at the facility at the time of submission. This option

EXHIBIT 9-1
RMP UPDATES

Change That Occurs at Your Facility	Date by Which You Must Update and Submit your RMP
No changes occur	Within 5 years of initial submission
A newly regulated substance is first listed by EPA	Within 3 years of the date EPA listed the newly regulated substance
A regulated substance is first present above its threshold quantity in: -- a process already covered; or -- a new process.	On or before the date the quantity of the regulated substance exceeds the threshold in the process.
A change occurs that results in a revised PHA or hazard review	Within 6 months of the change
A change occurs that requires a revised offsite consequence analysis	Within 6 months of the change
A change occurs that alters the Program level that previously applied to any covered process	Within 6 months of the change
A change occurs that makes the facility no longer subject to the requirements to submit a Risk Management Plan	Submit a revised registration (indicating that the RMP is no longer required) to EPA within 6 months of the change

is intended to assist facilities such as chemical warehouses, chemical distributors, and batch processors whose operations involve highly variable types and quantities of regulated substances, but who are able to forecast their inventory with some degree of accuracy. Under § 68.190, you are required to update and re-submit your RMP no later than the date on which a new regulated substance is first present in a covered process above a threshold quantity. By using predictive filing, you will not be required to update and re-submit your RMP when you receive a new regulated substance if that substance was included in your latest RMP submission (as long as you receive it in a quantity that does not trigger a revised offsite consequence analysis as provided in § 68.36).

If you use predictive filing, you must implement your Risk Management Program and prepare your RMP exactly as you would if you actually held all of the substances included in the RMP. This means that you must meet all rule requirements for each regulated substance for which you file, whether or not that substance is actually held on site at the time you submit your RMP. Depending on the substances for which you file, this may require you to perform additional worst-case and alternative-case scenarios and to implement additional prevention program elements. If you use this option, you must still update and resubmit your RMP if you receive a regulated substance that was not included in your latest RMP. You must also continue to comply with the other update requirements stated in § 68.190.

HOW DO I DE-REGISTER?

If your facility is no longer covered by this rule, you must submit a letter to the RMP Record Center within six months indicating that your stationary source is no longer covered.

Q & A
"REVISING" A PHA

Q. The rule states that I have to update my RMP whenever I revise a PHA. What constitutes a revised PHA? Every time I go through management of change procedures I make a notation in the PHA file for the process, but would that constitute a revised PHA if the change did not affect the validity of the PHA?

A. All changes (except replacement in kind) are subject to the management of change of procedures. When processes undergo minor changes (e.g., minor rerouting of a piping run), information is typically added to a PHA file to reflect the change, even though the validity of the PHA is not affected by the modification. These minor changes and the addition of information about the change to the PHA file are not considered a 'revision' of the PHA under the part 68. Major changes that invalidate' a PHA, leading you to 'update' or 'revalidate' the PHA so that it accurately reflects the hazards of the process, are considered a revision of the PHA under part 68.

CHAPTER 10: IMPLEMENTATION

10.1 IMPLEMENTING AGENCY

The implementing agency is the federal, state, or local agency that is taking the lead for implementation and enforcement of part 68. The implementing agency will review RMPs, select some RMPs for audits, and conduct on-site inspections. The implementing agency should be your primary contact for information and assistance.

WHO IS MY IMPLEMENTING AGENCY?

Under the CAA, EPA will serve as the implementing agency until a state or local agency seeks and is granted delegation under CAA section 112(l) and 40 CFR part 63, subpart E. You should check with the EPA Regional Office to determine if your state has been granted delegation or is in the process of seeking delegation. The Regional Office will be able to provide contact names at the state or local level. See Appendix C for addresses and contact information for EPA Regions and state implementing agencies.

IF THE PROGRAM IS DELEGATED, WHAT DOES THAT MEAN?

To gain delegation, a state or local agency must demonstrate that it has the authority and resources to implement and enforce part 68 for all covered processes in the state or local area. Some states may, however, elect to seek delegation to implement and enforce the rule for only sources covered by an operating permit program under Title V of the CAA. When EPA determines that a state or local agency has the required authority and resources, EPA may delegate the program. If the state's rules differ from part 68 (a state's rules are allowed to differ in certain specified respects, as discussed below), EPA will adopt, through rulemaking, the state program as a substitute for part 68 in the state, making the state program federally enforceable. In most cases, the state will take the lead in implementation and enforcement, but EPA maintains the ability to enforce part 68 in states in which EPA has delegated part 68. Should EPA decide that it is necessary to take an enforcement action in the state, the action would be based on the state rule that EPA has adopted as a substitute for part 68. Similarly, citizen actions under the CAA would be based on the state rules that EPA has adopted.

Under 40 CFR 63.90, EPA will not delegate the authority to add or delete substances from § 68.130. EPA also plans to propose, in revisions to part 63, that authority to revise Subpart G (relating to RMPs) will not be delegated. With respect to RMPs, you would continue to be required to file your part 68 RMP, in the form and manner specified by EPA, to the central location EPA designates. You should check with your state to determine whether you need to file additional data for state use or submit amended copies of the RMP with the state to cover state elements or substances.

If your state has been granted delegation, it is important that you contact them to determine if the state has requirements in addition to those in part 68. State rules may be more stringent than part 68. This document does not cover state requirements.

QS & AS
DELEGATION

Q. What states have been granted delegation or are in the process of seeking delegation?

A. Georgia has been granted delegation. The following states have indicated that they are interested in delegation:

California	Delaware	Florida	Hawaii	Louisiana	Mississippi
Missouri	New Jersey	Nevada	North Carolina	Ohio	Rhode Island
South Carolina					

Check with your EPA Regional contacts (see Appendix C) for a current list of states granted or seeking delegation.

Q. In what ways may state rules be more stringent? Does this document provide guidance on state differences?

A. States may impose more detailed requirements, such as requiring more documentation or more frequent reporting, specifying hours of training or maintenance schedules, imposing equipment requirements or call for additional analyses. Some states are likely to cover at least some additional chemicals and may use lower thresholds. This document does not cover state differences.

Q. Will the general duty clause be delegated?

A. The general duty clause (CAA section 112(r)(1)) is not included in part 68 and, therefore, will not be delegated. States, however, may adopt their own general duty clause under state law.

10.2 REVIEWS/AUDITS/INSPECTIONS (§ 68.220)

The implementing agency is required under part 68 to review and conduct audits of RMPs. Reviews are relatively quick checks of the RMPs to determine whether they are complete and whether they contain any information that is clearly problematic. For example, if an RMP for a process containing flammables fails to list fire and explosion as a hazard in the prevention program, the implementing agency may flag that as a problem. The RMP data system will perform some of the reviews automatically by flagging RMPs submitted without necessary data elements completed.

Facilities may be selected for audits based on any of the following criteria, set out in §68.220:

- Accident history of the facility
- Accident history of other facilities in the same industry
- Quantity of regulated substances handled at the site
- Location of the facility and its proximity to public and environmental receptors

- The presence of specific regulated substances
- The hazards identified in the RMP
- A plan providing for random, neutral oversight

WHAT ARE AUDITS AND HOW MANY WILL BE CONDUCTED?

Under the CAA and part 68, audits are conducted on the RMP. Audits will generally be reviews of the RMP to review its adequacy and require revisions when necessary to ensure compliance with part 68. Audits will help identify whether the underlying risk management program is being implemented properly. The implementing agency will look for any inconsistencies in the dates reported for compliance with prevention program elements. For example, if you report that the date of your last revision of operating procedures was in June 1998 but your training program was last reviewed or revised in December 1994, the implementing agency will ask why the training program was not reviewed to reflect new operating procedures.

The agency will also look at other items that may indicate problems with implementation. For example, if you are reporting on a distillation column at a refinery, but used a checklist as your PHA technique, or you fail to list an appropriate set of process hazards for the process chemicals, the agency may seek further explanations as to why you reported in the way you did. The implementing agency may compare your data with that of other facilities in the same industrial sector using the same chemicals to identify differences that may indicate compliance problems.

If audits indicate potential problems, they may lead to requests for more information or to on-site inspections. If the implementing agency determines that problems exist, it will issue a preliminary determination listing the necessary revisions to the RMP, an explanation of the reasons for the revisions, and a timetable. Section 68.220 provides details of the administrative procedures for responding to a preliminary determination.

The number of audits conducted will vary from state to state and from year to year. Neither the CAA nor part 68 sets a number or percentage of facilities that must be audited during a year. Implementing agencies will set their own goals, based on their resources and particular concerns.

WHAT ARE INSPECTIONS?

Inspections are site visits to check on the accuracy of the RMP data and on the implementation of all part 68 elements. During inspections, the implementing agency will probably review the documentation for rule elements, such as the PHA reports, operating procedures, maintenance schedules, process safety information, and training. Unlike audits, which focus on the RMP but may lead to determinations concerning needed improvements to the risk management program, inspections will focus on the underlying risk management program itself.

Implementing agencies will determine how many inspections they need to conduct. Audits may lead to inspections or inspections may be done separately. Depending on the focus of the inspection (all covered processes, a single process, or particular part of the risk management program) and the size of the facility, inspections may take several hours to several weeks.

10.3 RELATIONSHIP WITH TITLE V PERMIT PROGRAMS

Part 68 is an applicable requirement under the CAA Title V permit program and must be listed in a Title V air permit. You do not need a Title V air permit solely because you are subject to part 68. If you are required to apply for a Title V permit because you are subject to requirements under some other part of the CAA, you must:

- List part 68 as an applicable requirement in your permit
- Include conditions that require you to either submit a compliance schedule for meeting the requirements of part 68 by the applicable deadlines or include compliance with part 68 as part of your certification statement.

You must also provide the permitting agency with any other relevant information it requests.

The RMP and supporting documentation are not part of the permit and should not be submitted to the permitting authority. The permitting authority is only required to ensure that you have submitted the RMP and that it is complete. The permitting authority may delegate this review of the RMP to other agencies.

If you have a Title V permit and it does not address the part 68 requirement, you should contact your permitting authority and determine whether your permit needs to be amended to reflect part 68.

10.4 PENALTIES FOR NON-COMPLIANCE

Penalties for violating the requirements or prohibitions of part 68 are set forth in CAA section 113. This section provides for both civil and criminal penalties. EPA may assess civil penalties of not more than $27,500 per day per violation. Any one convicted of knowingly violating part 68 may also be punished by a fine pursuant to Title 18 of the U.S. Code or by imprisonment for no more than five years, or both; anyone convicted of knowingly filing false information may be punished by a fine pursuant to Title 18 or by imprisonment for no more than two years.

QS & AS
AUDITS

Q. If we are a Voluntary Protection Program (VPP) facility under OSHA's VPP program, are we exempt from audits?

A. You are exempt from audits based on accident history of your industry sector or on random, neutral oversight. An implementing agency that is basing its auditing strategy on other factors may include your facility although EPA expects that VPP facilities will generally not be a high priority for audits unless they have a serious accident.

Q. If we have been audited by a qualified third party, for ISO 14001 certification or for other programs, are we exempt from audits?

A. No, but you may want to inform your implementing agency that you have gained such certification and indicate whether the third party reviewed part 68 compliance as part of its audit. The implementing agency has the discretion to determine whether you should be audited.

Q. Will we be audited if a member of the public requests an audit of our facility?

A. The implementing agency will have to decide whether to respond to such public requests. EPA's intention is that part 68 implementation reflect that hazards are primarily a local concern.

CHAPTER 11: COMMUNICATION WITH THE PUBLIC

Once you have prepared and submitted your RMP, EPA will make it available to the public. Public availability of the RMP is a requirement under section 114(c) of the Clean Air Act (the Act provides for protection of trade secrets, and EPA will accordingly protect any portion of the RMP that contains Confidential Business Information). Therefore, you can expect that your community will discuss the hazards and risks associated with your facility as indicated in your RMP. You will necessarily be part of such discussions. The public and the press are likely to ask you questions because only you can provide specific answers about your facility and your accident prevention program. This dialogue is a most important step in preventing chemical accidents and should be encouraged. You should respond to these questions honestly and candidly. Refusing to answer, reacting defensively, or attacking the regulation as unnecessary are likely to make people suspicious and willing to assume the worst. A basic fact of risk communication is that trust, once lost, is very hard to regain. As a result, you should prepare as early as possible to begin talking about these issues with the community, Local Emergency Planning Committees (LEPCs), State Emergency Response Commissions (SERCs), other local and state officials, and other interested parties.

Communication with the public can be an opportunity to develop your relationship with the community and build a level of trust among you, your neighbors, and the community at large. By complying with the RMP rule, you are taking a number of steps to prevent accidents and protect the community. These steps are the individual elements of your risk management program. A well-designed and properly implemented risk management program will set the stage for informative and productive dialogue between you and your community. The purpose of this chapter is to suggest how this dialogue may occur. In addition, note that some industries have developed guidance and other materials to assist in this process; contact your trade association for more information.

11.1 BASIC RULES OF RISK COMMUNICATION

Risk communication means establishing and maintaining a dialogue with the public about the hazards at your operation and discussing the steps that have been or can be taken to reduce the risk posed by these hazards. Of particular concern under this rule are the hazards related to the chemicals you use and what would happen if you had an accidental release.

Many companies, government agencies, and other entities have confronted the same issue you may face: how to discuss with the public the risks the community is subject to. Exhibit 11-1 outlines seven “rules” of risk communication that have been developed based on many experiences of dealing with the public about risks.

A key message of these "rules" is the importance and legitimacy of public concerns. People generally are less tolerant of risks they cannot control than those they can. For example, most people are willing to accept the risks of driving because they have some control over what happens to them. However, they are generally more uncomfortable accepting the risks of living near a facility that handles hazardous chemicals if they feel that they have no control over whether the facility has an accident. The Clean Air Act’s provision for public availability of RMPs gives public

an opportunity to take part in reducing the risk of chemical accidents that might occur in their community.

Exhibit 11-1: Seven Cardinal Rules of Risk Communication

1. Accept and involve the public as a legitimate partner
2. Plan carefully and evaluate your efforts
3. Listen to the public's specific concerns
4. Be honest, frank, and open
5. Coordinate and collaborate with other credible sources
6. Meet the needs of the media
7. Speak clearly and with compassion

HAZARDS VERSUS RISKS

Dialogue in the community will be concerned with both hazards and risks; it is useful to be clear about the difference between them.

Hazards are inherent properties that cannot be changed. Chlorine is toxic when inhaled or ingested; propane is flammable. There is little that you can do with these chemicals to change their toxicity or flammability. If you are in an earthquake zone or an area affected by hurricanes, earthquakes and hurricanes are hazards. When you conduct your hazard review or process hazards analysis, you will be identifying your hazards and determining whether the potential exposure to the hazard can be reduced in any way (e.g., by limiting the quantity of chlorine stored on-site).

Risk is usually evaluated based on several variables, including the likelihood of a release occurring, the inherent hazards of the chemicals combined with the quantity released, and the potential impact of the release on the public and the environment. For example, if a release during loading occurs frequently, but the quantity of chemical released is typically small and does not generally migrate offsite, the overall risk to the public is low. If the likelihood of a catastrophic release occurring is extremely low, but the number of people who could be affected if it occurred is large, the overall risk may still be low because of the low probability that a release will occur. On the other hand, if a release occurs relatively frequently *and* a large number of people could be affected, the overall risk to the public is high.

The rule does not require you to assess risk in a quantitative way because, in most cases, the data you would need to estimate risk levels (e.g., one in 100 years) are not available. Even in cases where data such as equipment failure rates are available, there are large uncertainties in using that data to determine a numerical risk level for your facility, because your facility is probably not the same as other facilities, and your

situation may be dynamic. Therefore, you may want to assign qualitative values (high, medium, low) to the risks that you have identified at your facility, but you should be prepared to explain the terms if you do. For example, if you believe that the worst-case release is very unlikely to occur, you must give good reasons; you must be able to provide specific examples of measures that you have taken to prevent such a release, such as installation of new equipment, careful training of your workers, rigorous preventive maintenance, etc. You should also be able to show documentation to support your claim.

WHO WILL ASK QUESTIONS?

Your Local Emergency Planning Committee (LEPC) and other facilities can help you identify individuals in the following groups who may be reviewing RMP data and asking questions. Interested parties may include:

(1) Persons living near the facility and elsewhere in the community or working at a neighboring facility

(2) Local officials from zoning and planning boards, fire and police departments, health and building code officials, elected officials, and various county and state officials

(3) Your employees

(4) Special interest groups including environmental organizations, chambers of commerce, unions, and various civic organizations

(5) Journalists, reporters, and other media representatives

(6) Medical professionals, educators, consultants, neighboring companies and others with special expertise or interests

In general, people will be concerned about accident risks at your facility, how you manage the risks, and potential impacts of an accident on health, safety, property, natural resources, community infrastructure, community image, property values, and other matters. Those individuals in the public and private sector who are responsible for dealing with these impacts and the associated risks also will have an interest in working with you to address these risks.

WHAT INFORMATION ABOUT YOUR FACILITY IS AVAILABLE TO THE PUBLIC?

Even though the non-confidential information you provide in your RMP is available to the public, it is likely that people will want additional information. Interested parties will know that you retain additional information at your facility (e.g., documentation of the results of the offsite consequence analysis reported in your RMP) and are required to make it available to EPA or its implementing agency during inspections or compliance audits. Therefore, they may request such information. EPA encourages you to provide public access to this information. If EPA or its implementing agency were to request this information, it would be available to the public under section 114(c) of the CAA.

The public may also be interested in other information relevant to risk management at your facility, such as:

- Submissions under sections 302, 304, 311-312, and 313 of the Emergency Planning and Community Right to Know Act (EPCRA) reporting on chemical storage and releases, as well as the community emergency response plan prepared under EPCRA section 303
- Other reports on hazardous materials made, used, generated, stored, spilled, released and transported, that you submitted to federal, state, and local agencies
- Reports on workplace safety and accidents developed under the Occupational Safety and Health Act that you provide to employees, who may choose to make the information publicly available, such as medical and exposure records, chemical data sheets, and training materials
- Any other information you have provided to public agencies that can be accessed by members of the public under the federal Freedom of Information Act and similar state laws (and that may have been made widely available over the Internet)
- Any published materials on facility safety (either industry- or site-specific), such as agency reports on facility accidents, safety engineering manuals and textbooks, and professional journal articles on facility risk management, for example

11.2 SAMPLE QUESTIONS FOR COMMUNICATING WITH THE PUBLIC

Smaller businesses may not have the resources or time to develop the types of outreach programs, described later in this chapter, that many larger chemical companies have used to handle public questions and community relations. For many small businesses, communication with the public will usually occur when you are asked questions about information in your RMP. It is important that you respond to these questions constructively. Go beyond just answering questions; discuss what you have done to prevent accidents and work with the community to reduce risks. The people in your community will be looking to you to provide answers.

To help you establish a productive dialogue with the community, the rest of this section presents questions you are likely to be asked and a framework for answering them. These are elements of the public dialogue that you may anticipate. The person from your facility designated as responsible for communicating with the public should review the following and talk to other community organizations to determine which questions are most likely to be raised and identify other foreseeable issues. Remember that others in the community, notably LEPCs and other emergency management organizations are also likely to be asked these and other similar questions. You should consider the unique features of your facility, your RMP, and your historical relationship with the community (e.g., prior accidents, breakdowns in the coordination of emergency response efforts, and management-labor disputes), and work together

with these other organizations to answer these questions for your situation and to resolve the issues associated with them.

What does your worst-case release distance mean?

The distance is intended to provide an estimate of the maximum possible area that might be affected under catastrophic conditions. It is intended to ensure that no potential risks to public health are overlooked, but the distance to an endpoint estimated under worst-case conditions should not be considered a "public danger zone."

In most cases, the mathematical models used to analyze the worst-case release scenario as defined in the rule may overestimate the area that would be impacted by a release. In other cases, the models may underestimate the area. For distances greater than approximately six miles, the results of toxic gas dispersion models are especially uncertain, and you should be prepared to discuss such possibilities in an open, honest manner.

Reasons that modeling may underestimate the distance generally relate to the inability of some models to account for site-specific factors that might tend to increase the actual endpoint distance. For example, assume a facility is located in a river valley and handles dense toxic gases such as chlorine. If a release were to occur, the river valley could channel the toxic cloud much farther than it might travel if it were to disperse in a location with generally flat terrain. In such cases, the actual endpoint distance might be longer than that predicted using generic lookup tables.

Reasons that the area may be overestimated include:

- For toxics, the weather conditions (very low wind speed, calm conditions) assumed for a worst-case release scenario are uncommon and probably would not last as long as the time the release would take to travel the distance estimated. If weather conditions are different, the distance would be much shorter.

- For flammables, although explosions can occur, a release of a flammable is more likely to disperse harmlessly or burn. If an explosion does occur, however, this area could be affected by the blast; debris from the blast could affect an even broader area.

- In general, some models cannot take into account other site-specific factors that might tend to disperse the chemicals more quickly and limit the distance.

Note: When estimating worst case release distances, the rule does not allow facilities to take into account active mitigation systems and practices that could limit the scope of a release. Specific systems (e.g., monitoring, detection, control, pressure relief, alarms, mitigation) may limit a release or prevent the failure from occurring. Also, if you are required to analyze alternative release scenarios (i.e., if your facility is in Program 2 or Program 3), these scenarios are generally more realistic than the worst case, and you can offer to provide additional information on those scenarios.

What does it mean that we could be exposed if we live/work/shop/go to school X miles away?

(For an accident involving a flammable substance):

The distance means that people who are in that area around the facility could be hurt if the contents of a tank or other vessel exploded. The blast of the explosion could shatter windows and damage buildings. Injuries would be the result of the force of the explosion and of flying glass or falling debris.

(For an accident involving a toxic substance):

The distance is based on a concentration of the chemical that you could be exposed to for an hour without suffering irreversible health effects or other symptoms that would make it difficult for you to escape. If you are within that distance, you could be exposed to a greater concentration of the chemical. If you were exposed to higher levels for an extended period of time (10 minutes, 30 minutes, or longer), you could be seriously hurt. However, that does not mean that you would be. Remember, for worst case scenarios, the rule requires you to make certain conservative assumptions with respect to, for example, wind speed and atmospheric stability. If the wind speed is higher than that used in the modeling, or if the atmosphere is more unstable, a chemical release would be dispersed more quickly, and the distances would be much smaller and the exposure times would be shorter. If the question pertains to an alternative release scenario, you probably assumed typical weather conditions in the modeling. Therefore, the actual impact distance could be shorter or longer, and you should be prepared to acknowledge this and clearly explain how you chose the conditions for your release scenario.

In general, the possibility of harm depends on the concentration of the chemical you are exposed to and the length of time you are exposed.

IF THERE IS AN ACCIDENT, WILL EVERYONE WITHIN THAT DISTANCE BE HURT? WHAT ABOUT PROPERTY DAMAGE?

In general, no. For an explosion, everyone within the circle would certainly feel the blast wave since it would move in all directions at once. However, while some people within the circle could be hurt, it is unlikely that everyone would be since some people would probably be in less vulnerable locations. Most injuries would probably be due to the effects of flying glass, falling debris, or impact with nearby objects.

Two types of chemicals may be modeled - toxics and flammables. Releases of flammables do not usually lead to explosions; released flammables are more likely to disperse without igniting. If the released flammable does ignite, a fire is more likely than an explosion, and fires are usually concentrated at the facility.

For toxic chemicals, whether someone is hurt by a release depends on many factors. First, the released chemicals would usually move in the direction of the wind (except for some dense gases, which may be constrained by terrain features to flow in a different direction). Generally, only people downwind from the facility would be at risk of exposure if a release occurred, and this is normally only a part of the population inside the circle. If the wind speed is moderate, the chemicals would disperse quickly, and people would be exposed to lower levels of the chemical. If the release is stopped quickly, they might be exposed for a very short period time, which is less likely to cause injury. However, if the wind speed is low or the release continues for a long time, exposure levels will be higher and more dangerous. The population at risk would be a larger proportion of the total population inside the circle. You should be prepared to discuss both possibilities.

Generally, it is the people who are closest to the facility — within a half mile or less — who would face the greatest danger if an accident occurred.

Damage to property and the environment will depend on the type of chemical released. In an explosion, environmental impacts and property damage may extend beyond the distance at which injuries could occur. For a vapor release, environmental effects and property damage may occur as a result of the reactivity or corrosivity of the chemical or toxic contamination.

HOW SURE ARE YOU OF YOUR DISTANCES?

Perhaps the largest single difficulty associated with hazard assessment is that different models and modeling assumptions will yield somewhat different results. There is no one model or set of assumptions that will yield "certain" results. Models represent scientists' best efforts to account for all the variables involved in an accidental release. While all models are generally based on the same physical principles, dispersion modeling is not an exact science due to the limited opportunity for real-world validation of results. No model is perfect, and every model represents a somewhat different analytical approach. As a result, for a given scenario, people can use different consequence models and obtain predictions of the distance to the toxic endpoint that in some situations might vary by a factor of ten. Even using the same model, different input assumptions can cause wide variations in the predictions. It follows that, when you present a single predicted value as your best estimate of the predicted distance, others will be able to claim that the answer ought to be different, perhaps greater, perhaps smaller, depending on the assumptions used in modeling and the choice of model itself.

You therefore need to recognize that your predicted distance lies within a considerable band of uncertainty, and to communicate this fact to those who have an interest in your results. A neighboring facility handling the same covered substances as you do may have come up with a different result for the same scenario for these reasons.

If you use EPA's *RMP Offsite Consequence Analysis Guidance* or one of the industry-specific guidance documents that EPA has developed, you will be able to address the issue of uncertainty by stating that the results you have generated are conservative (that is they are likely to overestimate distances). However, if you use other models, you will have to provide your own assessment of where your specific prediction lies within the plausible range of uncertainties.

WHY DO YOU NEED TO STORE SO MUCH ON-SITE?

If you have not previously considered the feasibility of reducing the quantity, you should do so when you develop your risk management program. Many companies have cited public safety concerns as a reason for reducing the quantities of hazardous chemicals stored on-site or for switching to non-hazardous substitutes. If you have evaluated your process and determined that you need a certain volume to maintain your operations, you should explain this fact to the public in a forthright manner. As appropriate, you should also discuss any alternatives, such as reducing storage quantities and scheduling more frequent deliveries. Perhaps these options are feasible - if so, you should consider implementing them; if not, explain why you consider these alternatives to be unacceptable. For example, in some situations, more frequent deliveries would mean more trucks carrying the substance through the community on a regular basis and a greater opportunity for smaller-scale releases because of more frequent loading and unloading.

WHAT ARE YOU DOING TO PREVENT RELEASES?

If you have rigorously implemented your risk management program, this question will be your chance, if you have not already done so, to tell the community about your prevention activities, the safe design features of your operations, the specific activities that you are performing such as training, operating procedures, maintenance, etc., and any industry codes or standards you use to operate safely. If you have installed new equipment or safety systems, upgraded training, or had outside experts review your site for safety (e.g., insurance inspectors), you could offer to share the results. You may also want to mention state or federal rules you comply with.

WHAT ARE YOU DOING TO PREPARE FOR RELEASES?

For such questions, you will need to talk about any coordination that you have done with the local fire department, LEPC, or mutual aid groups. Such coordination may include activities such as defining an incident command structure, developing notification protocols, conducting response training and exercises, developing mutual aid agreements, and evaluating public alert systems. This description is particularly important if your employees are not designated or trained to respond to releases of regulated substances.

If your employees will be involved in a response, you should describe your emergency response plan and the emergency response resources available at the facility (e.g., equipment, personnel), as well as through response contractors, if appropriate. You also may want to indicate the types of events for which such resources are applicable. Finally, indicate your schedule for internal emergency response training and drills and exercises and discuss the results of the latest relevant drill or exercise, including problems found and actions taken to address them.

DO YOU NEED TO USE THIS CHEMICAL?

Again, if you have not yet considered the feasibility of switching to a non-hazardous substitute, you should do so when you develop your risk management program. Assuming that there is no substitute, you should describe why the chemical is critical to what you produce and explain what you do to handle it safely. If there are substitutes available, you should describe how you have evaluated such options.

WHY ARE YOUR DISTANCES DIFFERENT FROM THE DISTANCES IN THE EPA LOOKUP TABLES?

If you did your own modeling, this question may come up. You should be ready to explain in a general way how your model works and why it produces different results. EPA allows using other models (as long as certain parameters and conditions specified by the rule are met) because it realizes that EPA lookup table results will not necessarily reflect all site-specific conditions.

In addition, although all models are generally based on the same physical principles, dispersion modeling is not an exact science due to the limited opportunity for real-world validation of the results. Thus, the method by which different models combine the basic factors such as wind speed and atmospheric stability can result in distances that readily vary by a factor of two (e.g., five miles versus ten miles). The introduction of site-specific factors can produce additional differences.

EPA recognizes that different models will produce differing predictions of the distance to an endpoint, especially for releases of toxic substances. The Agency has provided a discussion of the uncertainties associated with the model it has adopted for the OCA Guidance. You need to understand that the distances produced by another model lie within a band of uncertainty and be able to demonstrate and communicate this fact to those who are reviewing your results.

HOW LIKELY ARE THE WORST-CASE AND ALTERNATIVE RELEASE SCENARIOS?

It is generally not possible to provide accurate numerical estimates of how likely these scenarios are. EPA has stated that providing such numbers for accident scenarios rarely is feasible because the data needed (e.g., on rates for equipment failure and human error) are not usually available. Even when data are available, there are large uncertainties in applying the data because each facility's situation is unique.

In general, the risk of the worst-case scenario is low. Although catastrophic vessel failures have occurred, they are rare events. Combining them with worst-case weather conditions makes the overall scenario even less likely. This does not mean that such events cannot or will not happen, however.

For the alternative scenario, the likelihood of the release is greater and will depend, in part, on the scenario you chose. If you selected a scenario based on your accident history or industry accident history, you should explain this to the public. You should also discuss any steps you are taking to prevent such an accident from recurring.

IS THE WORST-CASE RELEASE YOU REPORTED REALLY THE WORST ACCIDENT YOU CAN HAVE?

The answer to this question will depend on the type of facility you have and how you handle chemicals. EPA defined a specific scenario (failure of the single largest vessel) to provide a common basis of comparison among facilities nationwide. So, if you have only one vessel, EPA's worst case is likely to be the worst event you could have.

On the other hand, if you have a process which involves multiple co-located or interconnected vessels, it is possible that you could have an accident more severe than EPA's worst case scenario. If credible scenarios exist that could be more serious (in terms of quantities released or consequences) than the EPA worst case scenario, you should be ready to discuss them. For example, if you store chemicals in small containers such as 55-gallon drums, the EPA-defined worst-case release scenario may involve a limited quantity, but a fire or explosion at the facility could release larger quantities if multiple containers are involved. In this case, you should be ready to frankly discuss such a scenario with the public. If you take precautions to prevent such scenarios from occurring, you should explain these precautions also. If an accidental release is more likely to involve multiple drums than a single drum as a result, for example, of the drums being stored closely together, then you must select such a scenario as your alternative release scenario so that information on this scenario is available in your RMP.

Chemical manufacturers may want to talk about releases that could result from runaway reactions that could continue for several hours. This type of event could result in longer exposure times.

WHAT ABOUT THE ACCIDENT AT THE [NAME OF SIMILAR FACILITY] THAT HAPPENED LAST MONTH?

This question highlights an important point: you need to be aware of events in your industry (e.g., accidents, new safety measures) for two reasons. First, your performance likely will be compared to that of your competitors. Second, learning about the circumstances and causes of accidents at other facilities like yours can help you prevent such accidents from occurring at your facility.

You should be familiar with accidents that happen at facilities similar to yours, and you should have evaluated whether your facility is at risk for similar accidents. You should take the appropriate measures to prevent the accident from occurring and be prepared to describe these actions. If your facility has experienced a similar release in the past, this information may be documented in your accident history or other publicly available records, depending on the date and nature of the incident, the quantity released, and other factors. If you have already taken steps specifically designed to address this type of accident, whether as a result of this accident, a prior accident at your facility, or other internal decision-making, you should describe these efforts. If, based on your evaluation, you determine that the accident could not occur at your facility, you should discuss the pertinent differences between the two facilities and explain why you believe those differences should prevent the accident from occurring at your facility.

WHAT ACTIONS HAVE YOU TAKEN TO INVOLVE THE COMMUNITY IN YOUR ACCIDENT PREVENTION AND EMERGENCY PLANNING EFFORTS?

If you have not actively involved the community in accident prevention and emergency planning in the past, you should acknowledge this as an area where you could improve and start doing so as you develop your risk management program. First, you may want to begin participating in the LEPC, SERC, and regional mutual aid organizations if you aren't doing so already. Other opportunities for community involvement are fire safety coordination activities with the local fire department, joint training and exercises with local public and private sector response personnel, the establishment of green fields between the facility and the community, and similar efforts.

When discussing accident prevention and emergency planning with the community, you should indicate any national programs in which you participate, such as the Chemical Manufacturers Association's Responsible Care program or Community Awareness and Emergency Response program or OSHA's Voluntary Protection Program. If fully implemented, these programs can help improve the safety of the facility and the community. You may have future plans to participate in areas described previously or have new initiatives associated with the risk management program. Be sure you ask what else the community would like you to do and explain how you will do it.

CAN WE SEE THE DOCUMENTATION YOU KEEP ON SITE?

If the requested information is not confidential business information, EPA encourages you to make it available to the public. Although you are not required to provide this information to the public, refusing to provide it simply because you are not compelled to is not the best approach. If you decide not to provide any or most of this material, you should have good reasons for not doing so and be prepared to explain these reasons to the public. Simply taking a defensive position or referring to the extent of your legal obligations is likely to threaten the effectiveness of your interaction with the community. Offer as much information as possible to the public; if particular documents would reveal proprietary information, try to provide a redacted copy, summary, or some other form that answers the community's concerns. You may want to work with your LEPC on this issue. You should also be aware that information that EPA or the implementing agency obtains as part of an inspection or investigation conducted under section 114 of the Clean Air Act would be available to the public under section 114(c) of the Act to the extent it does not reveal confidential business information.

11.3 COMMUNICATION ACTIVITIES AND TECHNIQUES

Although this section is most applicable to larger companies, small businesses may want to review it and use some of the ideas to expand their communications with the public. To prepare for effective communication with the community, you should:

(1) Adopt an organizational policy that includes basic risk communication principles (see exhibit 11-1)

(2) Assign responsibilities and resources to implement the policy

(3) Plan to use "best communication practices"

ADOPT AN ORGANIZATIONAL COMMUNICATIONS POLICY

An organizational policy will support communication with the public on your RMP and make it an integral part of management practices. Otherwise, breakdowns are likely to occur, which could cause mistrust, hostility and conflicts.

A policy helps to establish communication as a normal organizational function and to present it as an opportunity rather than a burden or threat. The policy can be incorporated in an organization's policies, an approach taken by many companies who belong to the Responsible Care program of the Chemical Manufacturers Association (CMA). These companies have adopted CMA's Codes of Management Practices, which contain risk communication principles and practices.

Remember that what you communicate is more important than the type of communication policy or program you use, and what you actually *do* to maintain a safe facility is more important than anything you say. Your company's safety and prevention steps in your risk management program should serve as the core elements of any risk communication program.

ASSIGN RESPONSIBILITIES AND RESOURCES

A policy is only a paper promise until it is regularly and effectively implemented. Thus, you should follow up your communication policy by (1) having top management participate at the outset and at key points throughout the communication process, and (2) assigning communication responsibilities within your organization and providing the necessary resources.

Experience has demonstrated that assigning responsibility to knowledgeable managers, plant engineers, and staff and encouraging participation by employees, (most of whom are likely to be community residents) is a good communications practice. Delegating communication functions to outside technical consultants, attorneys, and public relations specialists has repeatedly failed to impress the community and even tends to incur mistrust. (However, if you hired a firm with acknowledged expertise in dispersion modeling, you may want them on hand to help respond to technical questions.)

Communications staff will need work time and resources to prepare presentation materials, hold meetings with interested persons in the community, and do other work necessary to respond to questions and concerns and maintain ongoing dialogue. A training program in communication skills and incentives for good performance also may be advisable.

Organizations have a legitimate interest in preventing disclosure of confidential business information or statements that inadvertently and unfairly harm the organization or its employees. Thus, you should assure that your risk communication staff is instructed on how to deal with situations that pose these problems. This may mean that you have an internal procedure enabling your staff to bring such situations to top management and legal counsel for quick resolution, keeping in mind that unduly defensive or legalistic responses that result in restricting the amount of information that is provided can damage or destroy the risk communication process.

Your communication staff may find the following steps helpful in addressing the priority issues in the communication process:

Prior to RMP Submittal

- Enlist employee support for, and involvement in, the communication process
- Build on work you have done with your LEPC, fire department, and local officials, and gain their insights
- Incorporate technical expertise, management commitment, and employee involvement in the risk communication process
- Use your RMP's executive summary to begin the dialogue with the community; be sure you have taken all of the steps you present
- Taking a community perspective, identify which data elements need to be clarified, interpreted, or amplified, and which are most likely to raise community concerns; then compile the information needed to respond and determine the most understandable methods (e.g., use of graphics) for presenting the information

At Submittal

- Review the RMP to assure that you are familiar with its data elements and how they were developed. In particular, review the hazard assessment, prevention, and response program features, as well as documentation of the methods, data, and assumptions used, especially if an outside consultant performed the analyses and developed these materials. You have certified their accuracy and your spokesperson should know them intimately, as they reflect your plan
- Review your performance in implementing the prevention and response programs and prepare to discuss problems identified and actions taken
- Review your performance in investigating accidents and prepare to discuss any corrective actions that followed

Other Steps

- Identify the most likely concerns about risks identified in the RMP but not fully addressed, consult with management and safety engineering, and determine additional measures the organization will take to resolve these concerns
- Avoid misrepresentations and minimize the roles of public relations specialists
- Identify "best communication practices" (as described in the next section) and plan how to use them

USE "BEST COMMUNICATION PRACTICES"

Many facilities already have gained considerable experience in communicating with the public. Lessons from their experiences are described below. However, the value of these best practices and your credibility will depend on your facility's possession and ongoing demonstration of certain essential qualities:

- Top management commitment (e.g., owner and facility manager) to improving safety
- Honesty, openness, and concern for the community
- Respect for public concerns and perceptions
- Commitment to maintaining a dialogue with all sectors of the community, to learning from this dialogue, and to being prepared to change your practices to make your facility more safe
- Commitment to continuous improvement through internal procedures for evaluating incidents and promoting organizational learning
- Knowledge of safety issues and safety management methods
- Good working relationships with the LEPC, fire department, and other local officials
- Active support for the LEPC and related activities
- Employee support and commitment
- Continuation of commitment despite potential public hostility or mistrust

Another note: Because each facility and community involves a unique combination of factors, the practices used to achieve good risk communication in one case do not necessarily ensure the same quality result when used in another case. Therefore, while it is advisable for you to review such experience to identify "best communication practices," you should carefully evaluate such practices to determine if they can be adapted to fit your unique circumstances. For example, if your facility is in the middle of an urban area, you probably will use different approaches than you would use if it were located in an industrial area far from any residential populations. These practices are complementary approaches to delivering your risk management message and responding to the concerns of the community.

With these cautions in mind, a number of "best" practices are outlined below for consideration. First, you will want to establish formal channels for information-sharing and communication with stakeholders. The most basic approaches include:

- Convene public meetings for discussion and dialogue regarding your risk management program and RMP and take steps to have the facility owner or

manager and all sectors of the community participate, including minorities and low-income residents

- Arrange meetings with local media representatives to facilitate their understanding of your risk management program and the program summary presented in your RMP

- Establish a repository of information on safety matters for the LEPC and the public and, if electronic, provide software for public use. Some organizations also have provided computer terminals for public use in the community library or fire department

Other, more resource-intensive activities of this type to consider include:

- Create and convene focus groups (small working groups) to facilitate dialogue and action on specific concerns, including technical matters, and take steps to assure that membership in each group reflects a cross section of the community and includes technically trained persons (e.g., engineers, medical professionals)

- Hold seminars on hypothetical release scenarios, prevention and response programs, applicable standards and industry practices, analytic methods and models (e.g., on dispersion of airborne releases, health effects of airborne concentrations), and other matters of special concern or complexity

- Convene special meetings to foster dialogue and collaborations with the LEPC and the fire department and to establish a mutual assistance network with other facility managers in the community or region

- Establish hot lines for telephone and e-mail communications between interested parties and your designated risk communication staff and, if feasible, a web site for posting useful information

In all of these efforts, remember to use plain language and commonly understood terms; avoid the use of acronyms and technical and legal jargon. In addition, depending on your audience, keep in mind that the preparation of multilingual materials may be useful or even necessary.

Secondly, you may want to initiate or expand programs that more directly involve the community in your operations and safety programs. Traditional approaches include:

- Arrange facility tours so that members of the public can view operations and discuss safety procedures with supervisors and employees

- Schedule drills and simulations of incidents to demonstrate how prevention and response programs work, with participation by community responders and other organizations (e.g., neighboring companies)

- Conduct a “Safety Street” - a community forum generally sponsored by several industries in a locality, where your representatives present facility

safety information, explain risks, and respond to public questions (see Section 11.4 for a reference to more information on this program)

- Periodically reaffirm and demonstrate your commitment to safety in accordance with and beyond regulatory requirements and present data on your safety performance, using appropriate benchmarks or measures, in newsletters and by posting the information at your web site

- Publicly honor and reward managers and employees who have performed safety responsibilities in superior fashion and citizens who have made important contributions to the dialogue on safety

If community interest is significant, you may also want to consider the following activities:

- Invite public participation in monitoring implementation of your risk management program elements

- Invite public participation in auditing your performance in safety responsibilities, such as chemical handling and tracking procedures and analysis and follow-up on accidents and near misses

- Organize a committee comprised of representatives from the facility, other industry, emergency planning and response organizations, and community groups and chaired by a community leader to independently evaluate your safety and communication efforts (e.g., a Community Advisory Panel). You may also want to finance the committee to pay for an independent engineering consultant to assist with technical issues and learn what can be done to improve safety, and thereby share control with the community

Your communication staff should review these examples, consider designing their own activities as well as joint efforts with other local organizations, and ultimately decide with the community on which set of practices are feasible and can best create a healthy risk communication process in your community. Once these decisions are made, you may want to integrate the chosen set of practices in an overall communication program for your facility, transform some into standard procedures, and monitor and evaluate them for continuous improvement.

OTHER COMMUNICATION OPPORTUNITIES

By complying with the RMP rule and participating in the communications process with the community, you should have developed a comprehensive system for preventing, mitigating, and responding to chemical accidents at your facility. Why not share this knowledge with your staff, others you do business with (e.g., customers, distributors, contractors), and, perhaps through industry groups, others in your industry? If you transfer this knowledge to others, you can help improve their chemical safety management capabilities, enhance public safety beyond your community, and possibly gain economic benefits for your organization.

11.4 FOR MORE INFORMATION

Among the numerous publications on risk communication, the following may be particularly helpful:

- *Improving Risk Communication*, National Academy Press, Washington, D.C., 1989
- "Safety Street" and other materials on the Kanawha Valley Demonstration Program, Chemical Manufacturers Association, Arlington, VA
- Community Awareness and Emergency Response Code of Management Practices and various Guidance, Chemical Manufacturers Association, Arlington, VA
- *Communicating Risks to the Public*, R. Kasperson and P. Stallen, eds., Kluwer Publishing Co., 1991
- "Challenges in Risk and Safety Communication with the Public," S. Maher, Risk Management Professionals, Mission Viejo, CA, April 1996
- Primer on Health Risk Communication Principles and Practices, Agency for Toxic Substances and Disease Registry, on the World Wide Web at atsdr1.atsdr.cdc.gov:8080
- *Risk Communication about Chemicals in Your Community: A Manual for Local Officials*, US Environmental Protection Agency, EPA EPCRA/Superfund/RCRA/CAA Hotline
- *Risk Communication about Chemicals in Your Community: Facilitator's Manual and Guide*, US Environmental Protection Agency, EPA EPCRA/Superfund/RCRA/CAA Hotline
- *Chemicals, the Press, and the Public: A Journalist's Guide to Reporting on Chemicals in the Community*, US Environmental Protection Agency, EPA EPCRA/Superfund/RCRA/CAA Hotline